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MIND

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY.

EDITED BY
PROF. G. F. STOUT.

WITH THE CO-OPERATION OF PROFESSOR E. B. TITCHENER, AMERICAN EDITORIAL REPRESENTATIVE, AND OF PROFESSOR WARD, PROFESSOR PRINGLE-PATTISON, DAVID MORRISON, M.A., AND OTHER MEMBERS OF AN ADVISORY COMMITTEE.

CONTENTS.

	PAGE
I.—Sense-Knowledge (III.): Professor JAMES WARD	129
II.—The Meaning of Matter and the Laws of Nature according to the Theory of Relativity: A. S. EDDINGTON, F.R.S.	145
III.—Omnipotence and Personality: W. M. THORBURN	159
IV.—Phenomenal Symbolism in Art: P. J. HUGHESDON	186
V.—Discussions:	
Mr. Bosanquet on Croce's Aesthetic: H. WILDON CARR	207
Croce's Aesthetic: BERNARD BOSANQUET	212
VI.—Critical Notice:	
A. N. Whitehead: <i>The Principles of Natural Knowledge</i> :	
C. D. BROAD	216
VII.—New Books	232
VIII.—Philosophical Periodicals	251
IX.—Note	256

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PSYCHOLOGY AND PHILOSOPHY.

I.—SENSE-KNOWLEDGE (III.).

BY PROFESSOR JAMES WARD.

PERCEPTUAL ORDERS: (II. TIME).

§ 7. Here again we have first to recall the essential factors in the genesis of temporal perception, and then to discuss the connexion between temporal perception and the conception of time.

We are apt to regard the temporal and spatial orders as resembling each other in respect of form and origin more closely than in fact they do. Since change of presentation is involved in even the simplest experience, and time is held to be involved wherever there is change, the *perception* of time has come to be regarded as at least coeval with that of space. Yet such is not necessarily the case; and could only be so if change of presentation were the same thing as presentation of change. But the difference between the two is vast. Nor are the perceptions of the two orders in fact coeval. The continuum to which the perception of time belongs, as already said, is psychologically that secondary continuum—*when in process of formation*—to which the name of memory-thread has been given.¹ Again it has more than once been proposed to lump space and time together as one continuum of four dimensions. It is, however, doubtful if this is allowable as more than a mathematical convention: if even as that, when time is also regarded as the one independent variable. At any rate such a procedure seems incompatible with perceptual

¹ It is given because it is the basis on which the development of memory proper rests; though it does not directly imply what is strictly to be called memory.

experience. Still, despite important differences, the perception of time has many analogies with that of space.

Thus we find in the perception of time, as we have found in the perception of space, a factor that disappears from their concepts. But the two factors are very different: there it was extensity—which is objective; here it is what we have called protensity—which is essentially subjective. It is through this that we ascribe to sense-data the characteristic of duration, and so speak of that too as protensity. It was Locke's merit that he made this duration the fundamental factor in temporal perception and compared 'the simple modes' of duration with 'the simple modes' of space¹—the one as the ideas 'we have of *perishing* distance, of which no two parts exist together,' the other the ideas 'we have of *lasting* distance, all of whose parts exist together'.² But 'perishing' seems at first sight a very incongruous epithet to apply to duration itself, and Locke's use of it is the more surprising when we recall an earlier passage in which he makes this characteristic remark: "If the names of things may at all direct our thoughts towards the originals of men's ideas (as I am apt to think they may very much) . . . the name duration [may suggest] that the continuation of existence with a kind of resistance to any destructive force, and the continuation of solidity, which is little different from hardness . . . have some analogy, and gave occasion to words so near akin as *durare* and *durum esse*".³ But this analogy has nothing in common with the idea of distance, least of all with that of '*perishing* distance'. So for the present we must leave it aside. After all we have then to recognise that duration according to Locke is primarily for us 'just another sort of distance' differing from that of space only in the fact that its so-called 'parts' are not static or simultaneous but perpetually flowing or successive.⁴ But he has still a subtle point in reserve. It is these fleeting parts of duration that make time; for "duration as set out by certain periods and marked by certain measures or epochs, is that," he thinks, "which most properly we call time".⁵ But having once got such a measure of duration as the diurnal and annual revolutions of the sun—at the conceptual level, that is to say—we come at length to talk of duration 'before all time' or 'when time shall be no more'—endless and empty duration, the purely conceptual time of science, in other words. But that is not the duration with which we begin.

¹ *Mode*, however, is in neither case the appropriate term.

² *Cf. Essay II., xv., § 12.*

³ *Ibid.*, § 4.

⁴ *Ibid.*, xiv., § 1.

⁵ *Ibid.*, § 17. However he often forgets this distinction.

That Locke was perfectly aware of this, he clearly shows when proceeding to 'consider what idea it is we have of *duration* and how we came by it'. In this inquiry he brings out another important fact of temporal perception. True, he also involves himself in the contradiction already mentioned;¹ and the contradiction is here more flagrant, for among the simple modes of duration the very first that he mentions directly involves relation. Still this by the way: what is now noteworthy in Locke's inquiry, the following passage will show: "It is evident," he continues, "to anyone who will but observe what passes in his own mind, that there is a train of ideas which constantly succeed one another . . . [there] as long as he is awake. Reflexion on these appearances of several ideas one after another . . . is that which furnishes us with the idea of *succession*; and the distance between any parts of that succession . . . is that we call *duration*. For whilst we receive successively several ideas in our minds, we know that we do exist; and so we call . . . the continuation of the existence of ourselves, or [of] anything else commensurate . . . [with such succession], the duration of ourselves or [of it]." ² There are two points to note here: (1) that Locke realised that for us filled or perceptual duration comes first, and (2) that its measure is subjectively not objectively determined; determined, *i.e.*, by the rate at which we can observe ideas or appearances to be successive. Accordingly he presently refers to this as explaining our inability to perceive motions that are either very slow or very swift as compared with this rate.

Still it cannot be said that Locke succeeded in reaching what we may call the essence of duration, or in making clear the precise connexion between it and 'the succession of ideas in our minds'. As regards duration Spinoza before him did better. Here is his definition: "*Duratio est attributum, sub quo rerum creatarum existentiam, prout in sua actualitate perseverant, concipimus*".³ Duration, in fact, as experienced is inseparable from the activity that all experience implies: it means not barely to exist but actively to persevere or persist. We may say that we experience it as a peculiar subjective measure correlative to that objective intensity which we regard as the matter or 'that' of our sense-data.⁴ Protensity

¹ In discussing his treatment of space, *cf.* last article, vol. xxviii., p. 456 *fin.*

² *Cf.* *Essay* II. xiv., § 3.

³ *Cogitata metaphysica*, 1653, I., iv., Van Vloten and Land's *Opera*, ii., p. 472. Italics mine.

⁴ *Cf.* first article, vol. xxviii., p. 274 *fin.*

and intensity are, in fact, mutually involved. "What the term duration ultimately represents," as I have said elsewhere, "is our immediate experience as actively striving and wearing on: it implies the actual living, which only is *actual* in so far as it is . . . full of changes endured or wrought."¹ Protensity is not, as extensity is, a sense-datum, though we ascribe it to sense-data. But like extensity it is continuous; and we may even say that it is differentiated, or rather that it differentiates itself. Further, though these primary differentiations are not co-existent, yet they give rise to a secondary continuum that may be so described—the memory-thread already mentioned. The differentiations of this, however, have their spatial analogue not in local signs of indefinite dimensions, but in a one-dimensional continuum of positional signs which we call 'temporal' signs. Like the positional signs of spatial perception we may find that they imply movement, but not space. It is these temporal signs that first lead us to the perception of time-order. Protensity, in fact, is not itself time any more than extensity is itself space: like that it is only one fundamental factor, and to call it 'a mode of time,' as Kant, for example, does, is as misleading as to call time 'a mode of duration,' as Locke did.

But time-order alone does not seem to imply time-distance as length or measure; though time-distance implies time-order. This, however, is a distinction we are apt to overlook, because of our prepossessions as to the priority of clock-time—prepossessions of which we ought in this inquiry completely to divest ourselves. Berkeley was here more precise than Locke. Thus he said: "Time being nothing, abstracted from the succession of ideas in our minds, it follows that the duration of any finite spirit must be estimated by the *number of ideas or actions succeeding each other* in that same spirit or mind."² This would make time discrete. Berkeley, however, overlooked the fact that, though our acts of attending are discrete, attention in the wider sense is continuous. The *focus* of consciousness alters at an approximately constant rate, yet the *field* of consciousness is by comparison permanent. The discrete acts are the acts of one continuously enduring subject.³ It was the selection of some definite part of the field of consciousness for closer or more concentrated attention that led psychologists to confer upon this part the

¹ *The Realm of Ends*, 3rd ed., p. 306.

² *Principles of Knowledge*, Pt. I., § 4. Fraser's ed., vol. i., p. 206. Italics mine.

³ Cf. first article, p. 265, and *Psychological Principles*, pp. 71 f., 219 ff.

distinction of the 'focus' that is 'apperceived' in contrast to the rest of the field that is barely 'perceived'. Here, so far, there is only a difference of degree. But it is a difference that is due to the action of the selecting subject; and we may even say this, when such acts are non-voluntarily determined; for the self-conserving 'perseverance' or *conatus* of the experient subject is still implied. It is usual to describe these acts as 'movements of attention,' and there is ample justification for so doing. This, however, is not the place for setting out the evidence.¹ Such movements obviously occupy a portion of clock-time, and are measurable in terms of this. They have, in fact, been measured experimentally with minute exactitude and under very various conditions. But perceptually they are neither measured nor measurable; for they are not themselves in turn 'set out and marked by' any succession. Yet these movements yield what for individual experience is an absolute time-measure or unit, corresponding to 'the [clock-] time of only one idea in our minds, without the succession of another'. And this, Locke said, is 'what we call an instant'.² It is then not 'what we most properly call time' but only a position or point not a portion of time, as in space a point is only a position not a portion of space. But instant and movement are incompatible ideas: *moment*, an older and happier term, is alone appropriate here; and the fact that Locke did not use it shows how imperfectly after all he realised the importance of movements of attention in the genesis of temporal perception. It is these movements or moments that determine what we call our *tempo* or 'normal perceptual time'.³

The temporal signs that constitute the memory-thread as a comparatively permanent continuum now seem to be reasonably accounted for as the consequences or residua of those

¹ Some account of this will be found in *Psychological Principles*, under various heads. Cf. the Index, *s.v.*, Attention.

² Cf. *Essay* II, xiv., § 10.

³ The connexion of this with intensity is an everyday experience. Like a stream, the shallower or less intense that is the faster it flows; similarly the deeper or more intense this is, the slower it flows—*ceteris paribus*. The subjective, that is to say, the individual character of the whole process is strikingly shown in the very different estimates formed of the actual lapse of clock-time under different circumstances—such as those of tedium or 'boredom' on the one hand, and those of play, 'pastime' or some absorbing interest on the other. Experimental measurements in such cases would doubtless yield some surprising results, if, for example, five minutes spent in impatiently waiting for a train that is late were compared with five minutes spent in solving a congenial problem.

same movements of attention on which *tempo* depends. In the *process of forming* this continuum, as was said at the outset,¹ we can discern all the factors involved in time-perception. But it is only when the formation is complete that distance in the past is ascribed to what is no more, and distance in the future to what is not yet. So we reach a simultaneous representation of time as a line or length, in which certain events have fixed positions—a representation from the standpoint of the *now* which may fairly be called 'time-perspective'; for, though it may occupy but one moment, it represents a duration that has lasted (or will last) through many. True, it is not attained till comparatively late, and the lower animals seem never to advance so far; yet it is rightly to be classed as sense-knowledge, for it presents a concrete order, a definite filled time. We only attain to the concept of 'pure' temporal order when the filling and the varying *tempi* of this actual experience are left out, and we put in its place Newton's absolute time flowing always at a constant rate.

It is obvious that there can be nothing empirically objective to correspond to such a concept. How then, if we deny its derivation from perceptual experience, are we to account for it? This question brings us again to Kant. His epistemology of time has the same merits and the same defects as those already noticed in his epistemology of space. Here again he rightly insists on the intuitive or perceptual character of temporal relations; but again he proceeds to treat time as a blank form lying ready in the mind and making the perception of the relations themselves first of all possible. Here again, too, as in the case of space, we have not an explanation, but rather—as Kant himself allowed—what is *prima facie* a mystery, "which, however, if we diligently trace it back to the beginning, may be dispelled".² That investigation psychology—so grievously neglected by Kant himself—has since made. The source of his mystery, we may now say, was just his own mistake.³ His two positions—that time is a pure *a priori* form, and that only through it such temporal relations as 'before,' 'after,' 'while,' imply, become possible—are incompatible. He precisely inverted the order at 'the beginning' which he was anxious to ascertain. His pure form is just the concept of empty time which genetically does not and could not come first.

There is still a feature of Kant's theory of time which—in

¹ Page 129 above.

² Cf. previous article, p. 458, and Kant's *Prolegomena*, § 6 fin.

³ Cf. first article, p. 274.

view of its prevalence—it may be well to consider, though it is not one that can retrieve his main position. On the contrary, as we may see, it further confirms our own. According to Kant the distinctive peculiarity of time is that it is the *form of the inner sense*. But that there is no such sense is a fact that may now be said to be beyond dispute.¹ The doctrine that there is, commonly attributed to Locke, was adopted by Tetens and other eclectic psychologists and finally accepted without question by Kant himself.² Locke, however, said expressly that reflexion, though a source of new ideas, is “not sense,” but unfortunately he added—with reprehensible carelessness—“yet it is very like it, and might *properly enough* be called *internal sense*”.³ Thus what for Locke after all was only an analogy came to be regarded as an identity. And, as we have seen above, there is nothing in Locke’s exposition of temporal perception to suggest that he regarded succession as a form of reflexion or ‘inner sense’. On the contrary he expressly described succession as a simple idea, not as a form of reflexion, but as the object of it, whenever we observe the train of impressions and thoughts ‘that take their turns in our understandings’. That succession cannot be at once a simple idea and yet a mode of duration he entirely overlooked, repeating the mistake he had already made in the case of space.⁴ It may indeed be regarded as a single object—an object of a higher order—for it implies a relation, as its prepositional prefix plainly shows. On the whole then, regarding knowledge from the historical standpoint, we may again conclude that the continuity between the perceptual and the conceptual in the case of temporal order is also clear.

NUMBER.

§ 8. In the so-called ‘natural numbers’ we have a new kind of order, which—unlike the temporal and spatial orders—is not continuous but essentially discontinuous or ‘discrete’. In this domain and the logical extensions of which it is capable the most exact knowledge we possess is contained. Here, if anywhere, we seem to be confronted by the great dividing line which is supposed to separate sense-knowledge from thought-knowledge. If it can be shown that here too some perceptual knowledge is prior to any conceptual

¹ Cf. *Psychological Principles*, pp. 14-16.

² For a compact and critical account of the whole doctrine, cf. Volkman, *Lehrbuch der Psychologie*, 2nd ed., ii. (1876), pp. 178 ff.

³ Cf. *Essay* II., i., § 4, first italics mine.

⁴ Cf. above p. 131.

knowledge such as that afforded by mathematics, then the continuity between sense-knowledge and thought-knowledge for which we contend will be again established. Here, as before, we must begin from the historical or genetic standpoint.¹ Probably the earliest definition of number in general is that of Euclid's *Elements*, viz., any "plurality of unities (*μονάδων*) taken together". Assume 'unity' to be here merely equivalent to one, we have then two terms—one and many—both involved in the *definiendum* and therefore presupposing knowledges prior to that of number in general which they serve to define: the knowledge of these terms in other words would be the 'first for us'. To verify this point we must examine that early definition of Euclid more closely.

Even if Euclid's term (*πληθος*) be not restricted to a finite plurality—any more than the natural numbers themselves are said to be—yet it plainly implies a lower limit to such finite plurality. Euclid's definition in other words excludes both zero or none and unity or one from the domain of number as implying plurality. A given number (or *Anzahl*, as the Germans say) so far is regarded as a definite plurality. At this stage in fact *one* is not itself a number but 'the measure of number,' as Aristotle maintained and the Pythagoreans assumed.² This reference to 'measure' is not quite accurate, but for the moment we may let it pass. But what we begin by 'measuring' we may parenthetically remark, is not yet number but merely plurality. Still less is nought or *none*, a number: it is not even 'a measure' of number, and is meaningless save as a symbol for emptiness. Moreover, the numerical notation of Europe lacked this 'mere cypher' till it was introduced from India by the Arabs during the Renaissance.³

Now it is precisely the epistemological characteristics of number as 'first known to us' which we are seeking to ascertain. These obviously could not include the later, to say nothing of the latest, of its conceptual extensions. So far *one*—already implied in this and that, here and there, now and then—is *contrasted with many*. And it is no more to be brought into line with *none* than never with time or nowhere with place. In the wider domain of scientific conception the case is doubtless different. Euclid's definition of number as

¹ Cf. I., p. 258 (vol. xxviii.).

² Cf. Aristotle, *Metaphysica*, XIV., chap. i., p. 1088a; M. Cantor, *Geschichte der Mathematik*, 1880, i., p. 159.

³ Cf. H. Hankel, *Zur Geschichte der Mathematik im Alterthum und Mittelalter*, 1874, pp. 41-46. The Arabic *ṣafira*, from which our cypher is derived, means we are told, to be empty.

plurality of unities is then too narrow. Numbers (*Anzahlen*) are then defined by means of certain operations, *viz.*, $n + 1$ and $n - 1$, operations which result in 0 and 1 being regarded as *themselves* numbers. They are then arranged in order before the other numbers, 2, 3 . . . with which, according to Euclid and ordinary thought, the series of numbers as definite pluralities begins. But to maintain that our first acquaintance with numbers begins with 0 and 1—as their subsequent scientific exposition may do—is a mistake such as only ignorance of psychology or contempt for it could excuse. The ignorance is displayed and the contempt avowed by G. Frege, who asserts that “0 and 1 are numbers in the same sense as two and three”;¹ yet saying at the same time that “number answers the question: how many (*wie viel*)”.² But to ask or answer this question we must at least know what many or plurality means. This much knowledge is essential to any understanding of the question though not in general sufficient for an immediate answer. Anyhow—unless the fact of a plurality being present is conceded—to ask how many is at this stage to be guilty of ‘the fallacy of many questions’—much as if—to take the stock instance—we asked a man: when did you leave off beating your wife—a question which is only relevant when the person addressed is known to be a husband who was in the habit of beating his wife. The first question in the present instance should be: are there any? Then the possible complete answers would be, No, none, or Yes, one, or Yes, many, *i.e.*, more than one. But to maintain that all three answers imply number in the same sense always and for everybody, seems a trifle hasty.

Frege, however, goes on to allow “that the numbers 0 and 1 have something peculiar (*etwas Besonderes*) about them, but so” he adds, “has every whole number; except that it strikes us ever less and less (*fällt weniger in die Augen*) as we advance (*bei den grösseren [Zahlen]*)”. Now we shall find that here, in spite of himself, this ‘logistician’ has recognised facts of the first importance for us in tracing the genesis of our knowledge of number. But his language is vague. What is it exactly we ask, that *saute aux yeux*, when on the one hand we compare collections (and eventually numbers) consisting of few components, and on the other, collections (and eventually numbers consisting of many)? We may notice that a given perceptual difference (*Unterschied*) in the former involves a greater, but in the latter a less,

¹ Cf. on this point, Husserl, *Philosophie der Arithmetik*, 1891, ch. viii., “Eins und Null als Zahlen,” pp. 142-148.

² *Die Grundlagen der Arithmetik*, 1884, p. 57, italics mine.

disparity (*Verschiedenheit*). Now in the case of 0 and 1, where the difference is one, the disparity is infinite. But in the case of a plurality that turns out eventually to be a hundred, say, and another that turns out eventually to be a hundred and one, neither the disparity nor the difference is perceptible at all. Apart of course, that is to say, from a special arrangement of the components, *e.g.*, of the hundred as a square of tens, when either the addition or the removal of one might be perceptible though the disparity would not be striking. But no disparity of the sort described enters at all into the scheme of natural numbers—however far we advance—so long as we consider only those which are finite. All numbers alike are here built up in the same way by continuous additions of 1; and there is nothing peculiar to the earlier steps distinguishing them from the later.

Between any two finite numbers, no matter what, there is then always a definite difference: two quantities or two aggregates may be equal but not two numbers. Our rude forefathers, who in this connexion were primarily interested in groups of objects of the same kind—if the corresponding difference were perceptible to them—might have said merely that one group was greater and the other less. So far the groups would be compared as wholes, no clear distinction being made between quantity and number; although the one implies continuity and the other discreteness. So far, in other words, the two groups would be perceived as differing only as, say, two piebald objects of different size. Such a difference, however, as in the case of two uniformly coloured objects is only perceptible provided it exceeds a certain amount, which is not independent of, but relative to, the wholes compared.¹ Of number as distinct from quantity, we repeat, there is here no clear perception: or, otherwise stated, the distinction of 'more or less' from 'many or few' has not yet fully emerged. And yet the two ideas are fundamentally different; and it is unfortunate that the description of number as 'discrete quantity' should have led so many to have associated them together.² 'Continuous quantity' can in general be measured, and measurement is indispensable in most forms of handicraft. Doubtless it is this fact which has led to the close association of quantity and

¹ Here in fact we come upon what in psychology is called Weber's Law, and this presumably is what Frege had in mind in the passage cited above.

² Cournot long ago called attention to this usage as unsound philosophically as well as linguistically; and he suggested the use of *quotity*, at any rate technically, to express the strict meaning of number (*Essai sur les fondements de nos connaissances*, 1851, i., p. 395).

number, despite their essential difference; for measurement commonly involves counting. But again the unit or standard that is repeated in measurement is quite distinct from the items or ones that are enumerated in counting. Both indeed are ones; but the former is more or less arbitrary and varies with circumstances. Whereas, for example, we have no choice about the numbers we assign to the legs of a biped or a quadruped, an octapod or a decapod, animal, and in innumerable other cases; yet we may call, say, a given length one or twelve, according as we take a foot or an inch as our unit.¹ This difference again is vital: we can measure a quantity, we cannot strictly measure a number, Aristotle notwithstanding. "The separation between number and quantity is thus complete: each is wholly independent of the other."² This, however, is only the logical side of the matter.

But there is another side, and here it is not logical 'implication,' the cardinal point with Frege and Russell, but what may be called psychical epigenesis,³ its historical presupposition, that is entitled to consideration. Here we have found that, despite the logical independence of number and quantity, all knowledge of the discrete is through a differentiation of what is continuous. We have seen this to be so in the case of space and time: local signs and temporal signs presuppose first of all extensity and protensity respectively; and they presuppose further subjective activity as an essential factor in their differentiation. As already incidentally remarked, in here and there, now and then, we have the first emergence of the discrete; for what is here is so far one and distinct from what is there, which is also one; and so with what is now and what was then. And this oneness or unity is not a sense-datum: it is due to the unifying act

¹ Perceptually, it is perhaps worth noting, the choice of units is not altogether arbitrary for us; though conceptually it has become entirely a matter of convention. For sense-knowledge then, to say that a particular object is large or small has a definite meaning; for here we are confronted with absolute *minima*. For thought-knowledge, on the other such expressions are at bottom meaningless. If the scale of all the dimensions in the universe were altered, Laplace once said, there would be no knowledge of the change. In point of fact there would be no change. As to this, however, there has been some controversy. This, of course, is not a question to discuss here, but there seems to be no doubt that the old relativity doctrine, at any rate, as one must say now, has maintained itself. The curious reader may be referred to a discussion between Lachalas and Delboeuf (cf. *Revue Philosophique*, xxxvii. (1894), pp. 73 ff.). But no similar supposition or controversy is possible in the case of number.

² Russell, *Principles of Mathematics*, 1903, p. 158.

³ Imperfectly recognised by Kant, cf. *Critique*, "Transcendental Deduction," § 27, B., p. 167.

which selects it for attention.¹ What is thus the object of attention may be in itself simple or complex, single or multiple: it is, for the nonce and so far, discerned as a whole.

But, though thus made discrete, this object is still concrete or particular. In other words, it is discriminated as this or that—for it is immaterial which demonstrative is used—within the persisting *continuum objectivum* to which our primitive impersonal propositions refer. The said this or that is not 'thought of' as one in the abstract, is not classed, so to say, in the genus 'one,' regardless of its concrete particularity. It is *perceived* as this or that, and perceived solely in virtue of the fact that its differentiation from the entire environmental situation is a fact which attracts the subject's interest here and now. But a distinction must here be noted, *en passant*, which is often overlooked. When we talk of this or that, only a single differentiation within the objective continuum is necessarily involved. The continuum itself is never either this or that. When, however, we refer to both this and that, two differentiations of the continuum are necessarily concerned.² Doubtless number also is implied,³ as it is, in all pluralities. The new fact is the separation that the two particulars involve. This fact, though fundamentally important for knowledge in this special case of dichotomy⁴—since here alone is further division excluded—is another common characteristic of all pluralities.

There is yet a third characteristic of perceived pluralities. Whatever is perceptually apprehended as a whole must be in some way circumscribed either in space or in time. It would not occur to the untutored savage to regard a snowstorm as a plurality (though it was but one event in time), but in calling bees circling round a hive 'a swarm' he would be regarding them as one. It is this 'piebald' pattern, due to the separation of its components, that distinguishes a single group from

¹ Cf. *Psychological Principles*, p. 72, and on Locke's mistake in overlooking this fact, compare pp. 320 ff.

² The so-called "differential theory of presentations" rests entirely on this confusion. Cf. *Psychological Principles*, pp. 84-86, 322.

³ This is perhaps a subtle point and yet it is a real one. When for example we compare this and that, what is explicit is just their likeness or difference in a certain respect: when we colligate them as a plurality, we regard them as one whole; and then they are simply items, and comparison is not involved.

⁴ Cf. Jevons' *Principles of Science*, 1872, on bifurcate classification, pp. 694 ff.

a single continuous object, as remarked above. Such patterns we find to vary considerably if we compare groups of one kind of object with those of another kind. Yet each retains more or less constantly its own characteristic features.¹ Any plurality, then, that can be perceived is intuited as in some sense ordered, *i.e.*, as definitely arranged either in space or time. But what we call disorder or irregularity, though still a definite arrangement,² is not a helpful one. And now at length, after these preliminaries—needless perhaps as they may appear to some—we may proceed to inquire how we first become acquainted with number.

It is obvious that the character of the pattern—its ‘figural moment’³ as it has been called, may facilitate or it may entirely frustrate our endeavour. But quite apart from this, there is a subjective limitation to our perceptual power, *viz.*, our restricted ‘span of prehension’ or the ‘narrowness of our consciousness’.⁴ How far within this narrow limit we can proceed does, however, depend entirely on the pattern presented, which we colligate or ‘take in,’ but do not ourselves construct. And how do we begin: is it by counting? A little reflexion will show that counting presupposes number, and that apart from some idea of this as the end we seek to attain, is nothing but iteration.⁵ And besides the pattern might be such that we could not be sure that we had not taken some items twice over and overlooked others altogether.

But there is at least one pattern where this risk disappears: that which we call a couple or a pair. In this case, however, we never count. It is often said that there are savage races who cannot count beyond two.⁶ This statement is most inaccurate: there are no savage races that count two, though there are some who have a binary system of numeration, count that is to say by ‘power’ of two; but they do not carry the process very far, for the simple reason that they seldom have any interest in so doing. A pair or couple is the simplest possible pattern; ⁷ for there can be no irregularity

¹ Every language bears witness to this fact by such words, *e.g.*, as avenue (of trees), cluster (of stars), phalanx (of soldiers), covey (of partridges), skein (of wild geese), herd (of deer), pack (of wolves), etc., etc.

² Cf. Bergson, *L'Évolution créatrice*, 1907, p. 242.

³ Husserl, *op. cit.*, pp. 227 ff.

⁴ Cf. *Psychological Principles*, pp. 73, 223. ⁵ Cf. *op. cit.*, p. 324.

⁶ Cf. Conant, *The Number Concept*, 1896, p. 2. In this interesting book, overloaded though it is with the numerical vocabularies of primitive peoples, there is no instance in which the name for two is ‘one and one’.

⁷ In itself, of course, the binary scale is just as endless as scales which are more complex and so more comprehensive, in that they employ more symbols. Its very simplicity in this respect led Leibniz to regard it as

about it: as soon as we regard it as a plurality we perceive it as two. But we can also perceive the number in larger pluralities, provided they are regular and terminated: without losing sight of the whole, we can distinguish each of its components. The limit seems to be a regular pattern of six or seven, like the following :::: for example. Any permanent embodiment of such a regular pattern within these limits might be taken as a basis or standard with which larger or less regular patterns might be compared or 'tallied'.¹ Counting or enumerating (Ger. *Zählung*) as distinct from mere iteration begins, then, in tallying what we may call the *numrand* with some standard which is independently intuited.

But merely to ascertain a one to one correspondence between the items of two collections will not enable us to tell of how many items each consists. Moreover, to call the two collections *numerically* equal (*gleichzählig*) is unmeaning unless—as already said—we know what is meant by number itself. Equivalent we may call them, if in so doing we refer only what is implied in their one to one correspondence. Any two such collections have been called 'similar classes' and also with less logical impropriety referred to as belonging to the *same* class. This is a class whose content will turn out to be the number implied in the extent of the similar classes, but whose own extent is for us altogether indefinite. Suppose we had several instances of a given 'class' of this kind—call it *n*—so arranged (as parallel rows of equidistant points, for example) that, though its content exceeded our 'span of prehension,' still their *similarity* was evident on inspection. We should so far be without any means of recognising again the logical *identity* of any one of them apart from its relation to the rest. Suppose now that we increased the second of our rows by an item: we should then have two classes, *n* and *n* + 1, which however we will call *p*. Passing next to

ideally the most perfect presentation of the structure of a numerical system.

¹And in fact, two, four, five and two fives, have been so taken (cf. Conant, *op. cit.*, ch. v., on 'Miscellaneous Number Bases'). The last has survived in our present decimal system owing to the natural fitness of the five digits on each hand as a complete pattern. The superiority of the duodecimal system to what is called (by P. Du-Bois Reymond, *Allgemeine Functionentheorie*, 1882, p. 19) 'the hateful decimal system' has been realised too late, it is feared, to secure its general adoption, notwithstanding Herbert Spencer's heroic efforts. Most assuredly if our mathematics were but symbolic logic and had no empirical basis whatever, we should never have had either that, or the 'hateful decimal system,' or indeed any other 'natural,' system whatever. How can the logician who discards psychology account for this naturalness?

the third row, let us make it equal to p by adding one item; and then by adding another, convert it into a new class ($p + 1$), calling this q . It is obvious that this procedure—which might be continued indefinitely—though it will correspond to some part or other of the series which we now call the natural numbers, will never tell us *what* part, so long as we only know that our first term n is a collection that is similar to such other collections as are similar to it. Suppose, however, that we had proceeded in the opposite fashion, and removed one item from the second row, thereby obtaining a new class ($n - 1$); and calling this m , repeated the same procedure, thus obtaining successively classes l , k , j , etc., also a part of the series of natural numbers. Indefinite repetition of the process is here obviously impossible: sooner or later—since we started from a finite collection—we should at length reach a row consisting of two items, the smallest possible collection, followed by a single item, the constituent of all collections. Resuming at this point the procedure by increments, the way would now be open to us for ascertaining the content of the 'class' n , or in other words the extent, *i.e.*, the absolute number, of the 'similar classes' it is supposed to include.

The number in question, the so-called class n , we have assumed to be of a higher order than such numbers as we can directly intuit by their pattern. To enumerate it then we should have to count. But counting is now possible, since we are starting where numbers can be distinctly perceived without counting. The counting we have here in mind, however, we need hardly repeat, is not that of the so-called 'ordinal numbers,' or that order which we call 'natural,' where each ordered term merely *follows* its immediate predecessor: it is the recognition of a cardinal number which *contains* some other increased by one or more, or is contained by some other exceeding it by one or more. The results either way are immediately evident up to a certain point; *viz.*, so long as the constituent patterns and the whole composite pattern can be distinctly intuited together. Instances in plenty are forthcoming among the variety of numerical nomenclatures which have now been collected of all these ways of determining a cardinal number.¹

¹ The central fact in all these is the number *radix*. It will be sufficient for our purpose to note the chief of these—the binary based on 'the couple' (from the root *copu'to*) or simplest combination of items; then the quinary determined by five fingers or 'a hand,' and the decimal or double of this, 'both hands'. Here quinary and decimal scales often exist side by side, but the former tends to take a secondary and subordinate place. In the binary scale we find instances not only of 2 and 1 but of

Within the limits of immediate intuition then the two correlatives 'more and less' are equally perceptible; and either addition or subtraction may determine the designation of a directly intuited number: sometimes the one course, sometimes the other is preferred—whichever is the simpler. All which seems to show that our first acquaintance is with cardinal and not with ordinal numbers. It seems further to show that the method of mathematical induction—which defines n , the higher of two successive numbers m and n , as $m + 1$ —is not the method of this stage of mental development; for we find numbers designated as $m + 2$, $m + 3$, and also as $n - 1$, -2 , or even -3 .¹ Is it not then clear that numbers and arithmetical operations, which we can only indirectly intuit by means of a system of symbols, historically presuppose numbers and operations that we intuit directly without any such aid? And further is it not clear that, though the mind of the savage may never advance beyond such sense-knowledge, even the scientific mind started from it?

But the phrase sense-knowledge is so apt to mislead that it seems desirable once more to point out that here as elsewhere sense-knowledge is not to be identified with sense-data. Sense-data are but the ground or *fundamentum* on which the fabric of sense-knowledge is raised. Here a physical aggregate is not the same as a collection, and a collection is not the same as a number. The aggregate is not for me a collection till I take it as a whole, nor a collection a number till I discern not merely collectively but severally the items which compose it.

2 and 2 or two pairs, as well as of 2 and 3; on the quinary scale we find 5 (or one hand) and 1, 5 and 2, 5 and 3, 5 and 4; on the decimal system similarly; save that here the higher number sometimes comes first, i.e., in the 'natural' order as in French *dix-sept*, *dix-huit*, sometimes second, as in the Greek *ἑνδεκα*, *δωδεκα*, Latin *undecim*, *duodecim*, English thirteen, fourteen. It is more interesting still to find that sometimes a number is expressed by subtraction, as in the Latin *duodeciginti*, *undeciginti*, 2 from 20, 1 from 20; but in more barbarous languages, 8 as 2 from 10, or simply as 'less two' the ten being merely implied; 9 as 1 from 10 or just 'less one'; even 7 as 'less three,' and 6 as 'less four' occur. We have an instance of the same sort in the Latin numeral signs iv., ix., xl., xc., etc.—the only one as regards 5 so far as I know. This denoting by subtraction seems readily explained if we assume familiarity with the higher number or *radix* as 'the halting point of the scale'. So 9 becomes 'almost 10' or 'incomplete 10,' as it is called in some languages (cf. Conant, *op. cit.*, ch. iii., "On the Origin of Number Words").

¹ See note above.

(To be continued.)

II.—THE MEANING OF MATTER AND THE LAWS OF NATURE ACCORDING TO THE THEORY OF RELATIVITY.

BY A. S. EDDINGTON, F.R.S.

THE theory of relativity has introduced into physics new conceptions of time and space, which have aroused widespread interest. Less attention has been paid to the position of matter in the new theory; but a natural interpretation suggests a view of the nature of matter, which is in some respects novel and is more precise than the theories hitherto current. It is perhaps a commonplace that, whatever may be the true nature of matter, it is the *mind* which from the crude substratum constructs the familiar picture of a substantial world around us. On the present theory we seem able to discern something of the motives of the mind in selecting and endowing with substantiality one particular quality of the external world, and to see that practically no other choice was possible for a rational mind. It will appear in the discussion that many of the best-known laws of physics are not inherent in the external world, but were automatically imposed by mind when it made the selection.

Probably the views here reached accord in a general way with some recognised philosophical theory; but it will be of interest to show how they are approached from the physical side. I must crave indulgence for the very imperfect expression of my ideas, being on the one hand debarred from using the conventions and terminology of mathematics, and on the other hand insufficiently expert to use the technical terms of philosophy.

It is convenient first to make some remarks on the general nature of physical theories. We believe that the ordinary objects of experience are very complex; in order to understand their mutual relations and to "explain" the phenomena, they must be resolved into simpler elements. Whilst it is a reasonable procedure to explain the complex in terms of the simple, this necessarily involves the paradox of explaining the familiar in terms of the unfamiliar. Thus the ultimate

concepts of physics are of a nature which must be left undefined; we may describe how they behave, but we cannot state what they *are* in any terms with which the mind is acquainted. The entities which appear in physical theories fall into three categories. We take for illustration the electromagnetic theory of light. There is first the æther. The word brings before the mind the idea of a limitless ocean pervading space; but during the last century, all the properties which would make the æther akin to any known fluid have had to be abandoned one by one. At the present time it would seem that the only property it possesses in common with a material ocean is that of being three-dimensional—and even this is now challenged by the relativity theory. To describe the nature (as distinct from the *properties*) of such a medium in terms familiar to the mind is impossible. Further, the æther is not in itself a subject for physical measurement. Secondly, there are quantities like electric and magnetic force; their nature is undefinable but their intensity can be measured by practical experiment. It is fundamental in the theory of relativity that anything measurable must necessarily be of the nature of a *relation* between two or more constituents of the external world; accordingly, we call objects of this second class relations. Thirdly, we have light, an object of experience; it is something common to our mental picture of the universe and to the analytical world of physics. The three classes are accordingly: (1) elementary analytical concepts, undefinable and unmeasurable; (2) relations, undefinable but measurable; (3) objects of experience, which are definable.

There is no particular awkwardness in developing a mathematical theory in which the elementary constituents are undefined. But it is desirable that at some stage in the discussion we should get to know what it is we are talking about; and this is achieved when we can identify one of the complex combinations of our undefinables with some object of experience recognised by the mind. Strange as it may seem, it is quite easy to overlook this necessity.

An objection may be raised here. Do not the things which can be measured—time, mass, electric force, etc.—come within experience? And may we not be satisfied when we reach the stage of dealing with things which can be measured? The physicist is satisfied, and rightly so; but then he is not usually occupied with evolving a complete scheme of things. Now all measures are made with the help of undoubted objects of experience—clocks, scales, galvanometers, etc.—and if we are to make a complete theory,

to understand how the galvanometer measures an electric current, we must first learn what a galvanometer is in terms of electric currents and the other simpler concepts of the theory. In other words the theory must be developed until it reaches some combination which can be identified as a galvanometer.

There are, in fact, a number of possible sites for a bridge between the analytical theory and the phenomena of perception. As has been said, the physicist commonly makes the connexion through things that are measured experimentally. Another alternative is to carry on the analytical development of the external world to the point at which it meets mind in the nerve-centres of the brain. In this paper I have taken the middle course of making the connexion through the everyday world which we see and feel around us. I regard the objects of this world as immediately recognisable to the mind—they are our definables—so that it is here that the bridge is most naturally made. We can to a certain extent *think forward* to electric currents, or *think backward* to mental processes; but it is more in accordance with the mathematical ideal to cross the bridge at this point, and carry on any further investigations in the analytical world rather than in the perceptual world.

In the relativity theory of nature the elementary analytical concept is the "point-event". In ordinary language a point-event is an instant of time at a particular point in space; but this is only one aspect of the point-event, and must not be taken as a definition, because the space and time of experience are derived concepts of considerable complexity. From what has already been said, it will be understood that the point-event is necessarily undefinable and its nature is outside the range of human understanding. The aggregate of all the point-events is called the "World"¹; and we postulate that this aggregate is four-dimensional. Pure mathematicians have, I believe, evolved a logical definition of the property implied by the term four-dimensional without appealing to intuitive notions of space and time; and it results that a particular point-event can be specified by the values of four variables or co-ordinates, which in practice are usually taken as three co-ordinates of space and one of time. Between any two neighbouring point-events there is a certain relation known as the "interval" between them. The relation is a quantitative one and can be assigned a numerical value. The term "interval" must not be taken

¹ The capital letter will show when the word is used in this technical sense.

as any guide to the real nature of the relation, which is beyond our power to conceive. The name refers not to its nature but to certain of its properties (ascertained later), which are those of a geometrical interval in a very extended mathematical sense—extended, because, for example, when the interval vanishes the two point-events are not necessarily identical.¹ The interval is not quite so transcendental as the point-event, because we are able to measure an interval practically with scales and clocks; but this is an anticipation of results which are only reached at a much later stage. Accordingly at present we are still pursuing a purely analytical development which has not as yet been connected with anything in nature which can be perceived or measured.

What we have here called the World might perhaps have been legitimately called the æther; at least it is the universal substratum of things which the relativity theory has given us in place of the æther. But the æther in physical theories has been gradually changing its character as science has developed, and perhaps this latest change from a three-dimensional to a four-dimensional aggregate is sufficiently fundamental to justify a new name.

Consider a small portion of the World. It consists of a large (possibly infinite) number of point-events, between every two of which an interval exists. If we are given the intervals between a point-event A and a sufficient number of other point-events, and also between B and the same point-events, can we calculate what will be the interval between A and B? In ordinary geometry there are rules for doing this; but in the present case, knowing nothing of the nature of the relation signified by the word interval, clearly we cannot predict any law *a priori*. There may be in any small region some law for calculating the interval AB, which need not be the same in all parts of the World. Whether this is so or not, and even if the individual intervals are entirely arbitrary and discontinuous, we may take the rule which best represents the average for the region; and the coarse measures of physics appreciate only the average. This rule, or average rule, of connexion of intervals expresses a quality of the World at the region considered, and may reasonably vary from region to region. One part of the World differs from another part—an intrinsic absolute difference,—and this on our theory is the starting point for the infinite variety of nature.

¹ Point-events may be compared to straight lines in three-dimensional space, and the interval to the shortest distance between them. When the shortest distance vanishes the two lines intersect but are not necessarily coincident.

An example may help to make this clear. I deliberately choose a non-geometrical example, because we must try to get rid of the obsession that the interval-relation is something geometrical. Compare the point-events to persons, and the intervals to the degree of acquaintance between them. Given the degree of acquaintance between A and C and between B and C, there is no rule for determining the degree of acquaintance between A and B. But a statistician might determine in any community the average rule, or "correlation," between the mutual acquaintance of two individuals, and their acquaintance with a third individual; if A and B know C, it increases the probability of their knowing one another. The correlation may be higher in some communities than in others, and so measure intrinsic differences between communities.

The mathematician measures this quality of the World by a set of coefficients, denoted individually by g_{11} , g_{12} , etc., up to g_{44} , and collectively by $g_{\mu\nu}$. But $g_{\mu\nu}$, besides containing the measure of this absolute quality, contains something else,—physical time and space, which we now believe are not intrinsic qualities of the world. Probably the philosopher and the physicist attach somewhat different meanings to time and space; to the former it is the seat of events, to the latter it is in addition the seat of measurement. Philosophical space-time has been implicitly introduced in postulating the World to be four-dimensional; but it is a long step from this to the partitioned space and time of the physicist which serves as a reticule for his measurements. In order then to give definite values to $g_{\mu\nu}$, we have first to choose a system of co-ordinates, *i.e.*, to define a particular way of partitioning space and time; and at the present stage we are not in a position to do this. The way out of the dilemma is to continue the analysis, leaving the space and time undetermined, but making sure that our results will apply whatever system of measuring space and time we ultimately decide to adopt. Fortunately a remarkable calculus has been invented by pure mathematicians for an entirely different purpose, which enables us to pursue the analytical development leaving the co-ordinates entirely undefined.

By considering the variation of $g_{\mu\nu}$ from point to point—its gradient—and the gradient of the gradient, other more complex characters of a region are obtained. But these involve the undetermined space and time, and our object is rather to refine out from space and time those things which are the intrinsic qualities of World. By an exceedingly complicated combination of these operations, we arrive at a

set of quantities called $G_{\mu\nu}$, which serve our purpose.¹ It must be remarked that a complicated mathematical formula may express a comparatively simple idea; for example, the formula for the curvature of a surface is by no means simple, yet everyone can form an idea of the property which it expresses. It is true that the physical conception measured by $G_{\mu\nu}$ is scarcely intelligible to us, but a being capable of conceiving five dimensions would grasp it more easily.

The quantity $G_{\mu\nu}$ plays a fundamental part in Einstein's generalised relativity theory, which asserts as a law of nature that in empty space

$$G_{\mu\nu} - \frac{1}{2}g_{\mu\nu}G = 0.$$

This is in fact the new law of gravitation, which in all ordinary cases agrees approximately with the Newtonian law of the inverse square, but in addition accounts for the celebrated astronomical discordance of the motion of the perihelion of Mercury. Unlike the Newtonian law, however, it does not presuppose any particular mode of measuring space and time, and it is for that reason especially that it commends itself to those who have a bias in favour of the relativity theory. It expresses a relation between the intrinsic properties of adjacent portions of the World, and not (like the Newtonian law) a relation between these properties and some extraneous space and time.

When matter is present the law is modified by the addition of a term $T_{\mu\nu}$ which is compounded from the density, momentum, stress, and energy of the matter present. The new term is a tensor, and accordingly the equation is still independent of space and time. The equation now reads

$$G_{\mu\nu} - \frac{1}{2}g_{\mu\nu}G = -8\pi T_{\mu\nu}.$$

I suppose that the usual view of these equations is that the first of them expresses some law inherent in the continuum—that the point-events are forced by some natural necessity to arrange themselves so that their relations accord with this law. And when matter intrudes, it disturbs the linkages and causes a rearrangement to the extent indicated by the second equation.

¹ Things like $g_{\mu\nu}$ and $G_{\mu\nu}$ (called tensors) occupy a position intermediate between intrinsic qualities of the World, and qualities which involve space and time haphazardly. The *vanishing* of a tensor does actually denote an intrinsic condition quite independent of time and space, and the equality of two tensors in the same region is also an absolute relation. It is for this reason that $G_{\mu\nu}$ (the simplest tensor after $g_{\mu\nu}$) attracts our attention.

² G is an abbreviation for a complicated combination of $g_{\mu\nu}$ and $G_{\mu\nu}$. The whole of the left side is a tensor, and therefore, although it does not measure an intrinsic quality of the World, its *vanishing* (expressed by the equation) denotes an intrinsic condition. (See previous footnote.)

But I think there is something incongruous in introducing an object of experience (matter) as a foreign body disturbing the domestic arrangements of the analytical concepts from which we have been building a theory of nature. It leads to a kind of dualism. What should we think of a chemical theory which, instead of analysing matter into atoms, postulated the existence of non-material atoms in addition to continuous matter and then proceeded to discover laws of nature connecting the behaviour of matter with that of the non-material atoms? There is a redundancy, and whenever we have an unnecessary multiplication of entities we are liable to find spurious laws of nature which are in reality only identifications. The result that the velocity of light is the same as that of electric waves does not determine any law of the æther, but merely the identification of light with electric waves.

We prefer therefore to take another view of the equations of Einstein. The vanishing of the left-hand side in any region denotes a definite and absolute condition of the World in that region; and, if Einstein's theory is true, that condition is common to all parts of the world which are empty of matter. Up to the present we have had no indication of what impression, if any, that condition of the World would make on our senses. *I suggest that it gives us the perception of emptiness.* The left-side of the equation is composed solely of analytical quantities which have not been defined; at some time or other, and preferably at the earliest possible stage in our synthesis, we have to identify the symbols of theory with things familiar to experience—in short, to learn what we are talking about. This is our opportunity. Mind surveying the external world passes over unnoticed many of the differences of quality which from the mathematical standpoint are most elementary; it has developed no faculty for perceiving the quality measured by $g_{\mu\nu}$; but we have now arrived in our discussion at a quality which mind takes cognisance of and recognises under the name of "emptiness". Einstein's law of gravitation is not a law of nature but a definition—the definition of a vacuum.

Similarly when $G_{\mu\nu} - \frac{1}{2}g_{\mu\nu}G$ does not vanish, the corresponding property of the world is perceived by us as a distribution of matter. Our second equation teaches us what density and state of motion of matter is the perceptual equivalent of any particular value of this world-property. This again is not a law inherent in the external world, but merely describes how the hitherto undefinable quality measured by the left-hand side of the equation is appreciated

by the human mind. Matter does not cause an unevenness in the gravitational field; the unevenness of the field *is* matter.

It may be worth while to turn aside for a moment to point out why the meaning of these equations has been obscured in the usual presentation of the relativity theory. The general course is to start with the "interval" as something immediately measurable with scales and clocks; accordingly $G_{\mu\nu}$ is measurable practically, and the equations are of the type normally encountered in physics in which all the quantities involved are measurable. But in a strict analytical development the introduction of scales and clocks before the introduction of matter is—to say the least of it—an inconvenient proceeding. Thus in our development $G_{\mu\nu}$ is not merely of unknown nature but unmeasurable. The equations therefore connect the familiar and measurable quantities on the right with the hitherto unfamiliar and unmeasurable quantities on the left, and have no value except as definitions.

Our contention, that the introduction of matter as a foreign entity in the gravitational field is superfluous, is so fundamental in what follows that at the risk of repetition we must endeavour to make plain the position taken up. How any physical phenomenon can produce a sensation in the mind must be a great mystery; and it would be difficult to say that any theory of the nature of matter makes our perception of it less or more easily understood. But those who are accustomed to regard the $g_{\mu\nu}$ as coefficients defining the geometry of space may well deem it altogether too fantastic that any combination of these quantities could create a sensation in the mind. But we have seen that the $g_{\mu\nu}$ are undefinables, and so we may attribute to them whatever nature we may conceive as best fitted to affect the mind; their geometrical interpretation is incidental, and is due to the fact that natural geometry depends on observations of the behaviour of matter and therefore ultimately on the behaviour of the $g_{\mu\nu}$. Granting then that a brain constituted of $G_{\mu\nu} - \frac{1}{2}g_{\mu\nu}G$ is at least as capable of being the seat of sensation as any other conceivable structure, there is no occasion to introduce any other kind of substance. We do not suppose that a ray of light is a rod which causes the electro-magnetic force to oscillate along its path; the electro-magnetic oscillations constitute the ray of light. We do not suppose that heat is a fluid which causes violent motions of the molecules of a body; the motions constitute heat. So too, we need not suppose that matter is a substance which causes irregularities in the gravitational field; the irregularities are matter. We shall

show presently that matter thus defined satisfies the well-known laws of mechanics.

According to this view matter can scarcely be said to exist apart from mind. Matter is but one of a thousand relations between the constituents of the World, and it will be our task to show why one particular relation has a special value for the mind. It need not surprise us that mind appreciates a particular relation rather than the external entities themselves; it is but an instance of the peculiarity that mind sees not the *paint* but the *picture*.

We have thus arrived at a definition of matter in terms of the analytical concepts and their relations. And it must be remarked that matter and the motion of matter have been defined separately. When we have fixed on any arbitrary way of measuring space and time, the different components of the tensor $T_{\mu\nu}$ give separately the density, momentum, and other combinations of the mass and velocity of matter. In practice we detect the motion of a body by noticing that the body has disappeared from one point of space and an apparently identical body has appeared at a neighbouring point. But as here brought in motion has nothing to do with this property. The analytical introduction of motion is rather curious. It is the ratio of two of the components of the World-property $G_{\mu\nu} - \frac{1}{2}g_{\mu\nu}G$. We have thus a definition of motion which does not involve the elusive idea of permanent identity of particular particles of matter; nor does it involve the definition of a particular way of measuring space and time, but rather we are able to proceed from it to introduce the partitioned space and time of physics.

Now the expression $G_{\mu\nu} - \frac{1}{2}g_{\mu\nu}G$ has a remarkable property known as the property of *conservation*. This property is simply a mathematical identity due to the way in which the expression has been built up from the simpler elements $g_{\mu\nu}$. It results from this property that, *provided we measure space and time in one of a certain limited number of ways*, matter will be permanent; for every particle which disappears at any point of space a corresponding mass will appear at a neighbouring point (conservation of mass). Further, the velocity of matter as introduced in the previous paragraph will agree with the velocity measured in the ordinary way; and this provides the basis of practical methods of defining the space and time here required. Finally, momentum and energy will obey the law of conservation.

These extensive results are in no sense laws of nature; they must hold in any imaginary world just as they do in the actual world. Or if $g_{\mu\nu}$ referred to relations in a human

community instead of to intervals of point-events, the same laws must still hold. To predict these laws we need to know nothing about the properties of the constituents of the external world; all that we need to know is, under what names will mind recognise the things which obey the laws?

For some unknown reason the mind appears to have a predilection for living in a more or less permanent universe. The idea of reality is at least closely associated with the idea of permanence. And so the mind has picked out from the external World a universe built from permanent elements (matter), and it is pleased to regard this as the real world. This, we have seen, involves a specialised way of measuring space and time; and so compelling is the desire for permanence that we have adopted this special space and time instinctively and find it hard to realise it is not the only one. I think this is the origin of the singling out of our familiar space and time from the many possible ways of resolving a four-dimensional continuum.

May we not go further? Why is it that of all the properties distinguishing different parts of the World, only one, and that a rather complex one, is perceived by us as substantial? Imagine an embryo mind surveying the external World without form and void—void because as yet mind has not made the final decision "Let *this* be matter". It is at the parting of the ways, uncertain with what feature of this cosmos to develop faculties of recognition. But already it feels the inborn necessity of finding a home for itself which shall be a rational world—a world of permanence and not a kaleidoscopic Wonderland. Point-events, their intervals, the property of $g_{\mu\nu}$ it can make nothing of; these have not the properties it needs. It seeks further, and comes to the quality which we have identified with matter. Here at last is suitable material. Only by developing senses and an imagination which makes this the most real external object can mind find for itself a suitable habitation.¹ The choice is made, and from a fleeting disorder of points and intervals the heavens and the solid earth stand clear.

It must be recognised that the conservation of mass is not exactly equivalent to the permanence of matter. Mind, whilst insisting on a general element of permanence in the things around it would have been satisfied with something much less perfect than the actual conservation of mass. The

¹ There are other still more complex qualities which would be suitable. If by any chance the mind has preferred one of these, the only difference is a law of gravitation more complicated than that of Einstein, but probably indistinguishable from it experimentally.

trees put forth leaves, the pond dries up and disappears; for the primitive mind these are definite exceptions, and the fact that delicate measurement traces a conservation of mass even in these cases is scarcely relevant. From another aspect the permanence of matter involves something more than the permanence of mass. When Alice's croquet-mallet turned into a flamingo, it is not necessary to suppose that the conservation of mass was outraged; but a rational mind requires that such incidents should be at any rate uncommon. The continued existence of solid bodies involves laws of nature which are as yet imperfectly understood, and we must leave this difficulty unanswered. Whilst we have not shown that $G_{\mu\nu} - \frac{1}{2}g_{\mu\nu}G$ possesses all the qualities desirable for the substance of a perceptual universe, we have shown that it possesses one of the most essential qualities, entirely lacking in any simpler combination; and it is reasonable to think that this had a great deal to do with its selection.

This view of the conditions determining the selection of matter, is strengthened by the consideration that matter does not play such a fundamental part in the analytical world as it does in the perceptual world. The recent tendency of physics has been to regard the quantity known as Action (energy integrated through time) as the most real thing in nature—to put the conclusion crudely. If the perceptual universe were constructed solely in accordance with physical considerations we should expect its substance to be Action. This lack of correspondence has often seemed perplexing, but we can now see that there is good reason for it.

The intervention of mind in the laws of nature is, I believe, more far-reaching than is usually supposed by physicists. I am almost inclined to attribute the whole responsibility for the laws of mechanics and gravitation to the mind, and deny the external world any share in them. It will probably be objected that this is going too far; no doubt the laws depend on the choice made by mind of the material for its universe, but surely Nature deserves some credit for furnishing material with such convenient properties? I doubt it. So far as I can see, all that Nature was required to furnish is a four-dimensional aggregate of point-events; and since these and their relations are undefined, and may be of any character whatever, it should in any case be possible to pick out a set of entities which would serve as point-events, however badly Nature had managed things in the external world. For the use made of the point-events mind alone is responsible.

We have seen that our identification of matter carries with it the laws of conservation of mass, energy, and momentum,

and the law of gravitation—in fact, all the laws of mechanics; and further the permanence of matter requires the time and space of experience with all the laws of geometry which belong to the latter. One important group of phenomena remains outside our scheme, *viz.*, the phenomena of electricity, magnetism, and light. A remarkable extension of Einstein's theory has been published recently by Weyl. In this the electromagnetic phenomena find a natural place in the analytical theory. The point of departure from the simpler theory hitherto followed is in the character of the relation called the interval; we have supposed that it is quantitative, so that two distant intervals AB and CD can be immediately compared. Weyl's theory does not admit this comparison at a distance; practically he considers only triangular relations between three neighbouring point-events. It is, of course, impossible to develop the consequences of this without mathematics; but it leads to qualities of the World which can be identified with electromagnetic force, electric charge¹ and current and these automatically satisfy the accepted laws of electromagnetic theory.

If we accept this extension of the theory, it looks at first sight as though all the so-called laws of nature are mere identifications—that the mind singles out for recognition those qualities which as a matter of mathematical identity must necessarily obey the laws it despotically imposes. The laws of mechanics, of electro-dynamics, and of gravitation cover almost the whole field of physics; and yet we have seen that not one of these imposes any constraint on the free arrangement of the external World. Are there then no genuine laws of the external World? Is the universe built from elements which are purely chaotic?

It can scarcely be doubted that our answer must be negative. There *are* laws in the external World, and of these one of the most important (perhaps the only law) is a law of atomicity. We have learnt that a certain quality of the World distinguishes matter from emptiness; we have not learnt why the quality called matter exists only in certain lumps, called atoms or electrons, all of comparable mass. It might be suggested that atomicity arises from a discontinuity in our

¹The relativity-theory seems almost to ignore the electrical theory of matter which is now so generally accepted; and it even has to contradict the *unqualified* statement that all mass is caused by an electromagnetic field. But there is no real disagreement. The electrical theory of matter has to admit that there is something of unknown nature which holds together the charge of an electron; and this extra element in the constitution of matter cannot be ignored in the theory of the gravitational relations of matter.

perceptions which can only vary by finite jumps; but atomicity is not primarily a matter of perception, and the atoms are needed in the analytical theory to account for phenomena which appear continuous to perception. A more likely suggestion is that our analysis into point-events is not final; and if we would carry the analysis beyond the point-event to something still more fundamental, then atomicity and the remaining laws of physics would become obvious identities. This may well be the case; and indeed the general attitude of physicists towards theories of nature is that an explanation of this kind is the only one which could be recognised as an ultimate explanation. But the proposed further analysis starts on a different footing from that which we have hitherto conducted. The difference may perhaps be expressed by saying that atomicity specialises the external world, whereas the other laws of physics specialise the mind. I mean that, starting from the postulate that the mind can appreciate only relations, the theory we have described is, or is intended to be, the most general possible theory of the way in which relations can combine to form permanent substance; and accordingly the laws of physics which result depend solely on this postulate as to the mind. Whatever the constitution of the external world,¹ we can pick out a four-dimensional aggregate of entities which we may take to be our point-events since these have been left undefined. But if we attempt to push the analysis behind the point-events, we are, I think, bound to particularise the structure. The investigation, therefore, will begin to distinguish the actual order of nature from other conceivable conditions, and the resulting properties are the true laws of nature.

Whilst we recognise that probably there are true laws of nature, it is perhaps significant that we have not been able to formulate any of them in a general way. Atomicity is manifested not merely in matter, but in connexion with radiation in a large number of phenomena known as quantum phenomena. Our present attitude before these discoveries is one of bewilderment; they have baffled attempts to formulate a general law; and the most successful partial explanations proceed on lines which outrage the canons of thought of the older school of physicists. Thus the domain, where the mind of the physicist has hitherto triumphed, comprises only those laws which have not their seat in the external world, but

¹A sufficient complexity is, of course, required. It is not necessary that the substratum from which we pick out the point-events should be four-dimensional. The straight lines in three-dimensional space form a four-dimensional aggregate.

spring ultimately from the mind. Will the human mind prove equal to formulating the genuine laws of a possibly irrational world, which it has had no part in shaping?

It must be admitted that the atomicity of matter presents a great difficulty from our present point of view. Matter is a property of the world to which the human mind attributes an exaggerated importance for reasons which Nature would regard as irrelevant; yet she seems to be in collusion with mind in singling out this property for atomicity. I can only suggest that the difficulty might disappear if we understood better the true relation between atomicity of matter and the more general atomicity which underlies all quantum phenomena. As far as we can understand it at present, there is some kind of atomicity of the quantity known in mechanics as *Action*, and this seems to be the fundamental origin of all atomic phenomena. If so, that must be Nature's own idea, for which she is in no way indebted to us. On Weyl's theory, *Action* is chosen because (to put it crudely) it is the only property of the World that could be atomic. Other properties cannot be measured in absolute terms, so that we could attach no meaning to the statement that each atom contains an equal amount of the property; but *Action* is a pure number, and one unit of *Action* is a definite amount everywhere. If then we can account for the apparent atomicity of matter as resulting from the quanta of *Action*, the difficulty alluded to will disappear; but this is at present a speculation.

The physical theories which form the bases of this argument are still on trial, and I am far from asserting that this philosophy of matter is a necessary consequence of discoveries in physics. It is sufficient that we have found one mode of thought tending towards the view that matter is a property of the world singled out by mind on account of its permanence, as the eye ranging over the ocean singles out the wave-form for its permanence among the moving waters; that the so-called laws of nature which have been definitely formulated by physicists are implicitly contained in this identification, and are therefore indirectly imposed by the mind; whereas the laws which we have hitherto been unable to fit into a rational scheme, are the true natural laws inherent in the external world, and mind has had no chance of moulding them in accordance with its own outlook.

III.—OMNIPOTENCE AND PERSONALITY.

BY W. M. THORBURN.

§ 1. God is good, and God is great. But it is mere poetry to call him Omnipotent. He is too obviously limited by the intractability of lifeless matter, and the wilfulness of His own living creatures. His plans for the harmonious perfection of the world are too conspicuously marred and thwarted by dolts, devils, and democrats. As the Anglican Baring-Gould said in 1897: "The new (Christian) revelation was the flower and fulfilment of Mosaism". But, "God's first purpose has been partially frustrated".¹ Here and elsewhere, he concurs with the fuller statement of the same position by the Presbyterian Principal Miller of Madras in 1888: "The Church has taken Israel's place. . . . And Israel's sad experience of the surrender of high ideals . . . has been repeated. . . . Those who led the Reformation had a place to fill, like that of Samuel, and Saul, and David. . . . But it was on a lower level, that they were forced to work."² Dr. Miller's context shows, however, that he does not consider the Reformers personally inferior to the Judges and Kings of Israel.

§ 2. "Philosophy and Science alike demand belief in a Personal and Limited God":³ declares the leader of English Pragmatism. "For me a Person is finite or is meaningless":⁴ is the emphatic opinion of the Oxford "Absolute"

¹ S. Baring-Gould: *Study of St. Paul*, ch. iii., pp. 72 and 70. See also p. 431.

² W. Miller, C.I.E., D.D.: *The Least of all Lands*, ch. vii. (Shiloh).

³ F. C. S. Schiller: *Riddles of the Sphinx* (1891), ch. x., § 7, p. 316 (new edn., 1912). Dean Rashdall (of Carlisle), one of the most enlightened dignitaries of the Church of England, has courageously said on p. 8 of his *Doctrine and Development* (1893): "Mr. Schiller deserves immense gratitude from all Christian theologians, for the logic and boldness, with which he has ventured to maintain the finitude of God". It is much to be desired, that Dr. Schiller's convincing reply, to a recent paper on *Omnipotence* by Archbishop D'Arcy of Dublin, should soon be made more widely accessible, than it can ever be in the *Proceedings* of the Aristotelian Society (April, 1918).

⁴ F. H. Bradley: *Appearance and Reality*, p. 532 (2nd edn.).

leader, F. H. Bradley. And Dean Rashdall virtually concurs: "Everything real is in that sense finite. God is certainly limited by all other beings in the Universe, . . . and in the frank recognition of this limitation lies the only solution of the Problem of Evil, which does not either destroy the goodness of God, or destroy moral distinctions altogether. . . . Personality is undoubtedly inconsistent with the idea of Absolute or Infinite Being."⁵ Canon Mozley had previously admitted much in criticising Augustine's notion. "Does it (Omnipotence) belong to the class of full and distinct, or of incomplete truths? Certainly to the latter; for, there appears at once a counter-truth to it, in the existence of Moral Evil, which must be referred to some cause other than God."⁶ Harnack says of an earlier Father: "But the omniscience and omnipotence of God have a limit, which indeed according to Origen lies in the nature of things".⁷ And "Deus non potest naturas rerum mutare": declared even that pillar of orthodoxy Francis de Vittoria († 1546), founder of the Salamanca School of Neo-Scholastic Theology.⁸ Duns Scotus († 1308) had already denied the rationality of the notion, that a First Cause could produce immediately the effects of Secondary Causes. Such a notion could be only a matter of faith: "Et hoc apparet quod ista propositio: Quidquid potest causa effectiva prima cum causa secunda, potest per se immediate: non est nota ex terminis, neque ratione naturali, sed est tantum credita".⁹ So far as we can

⁵ H. Rashdall: on Personality Human and Divine, in Sturt's (Oxford) *Personal Idealism* (1902), pp. 390 and 392. See also his *Doctrine and Development: Sermons I. and XVI.* And his Essay: *Is God Omnipotent?* in *Contentio Veritatis* (1902), 43, 45. In the heading for these pages in the Table of Contents, they are summed up as follows: "The existence of evil requires us to believe, that in a sense God's omnipotence is limited". Compare Dr. MacTaggart, in *Some Dogmas of Religion* (1906): "If a wise and good being has used means to an end, this is a positive proof that he is not omnipotent". For, if he were: "He could get the ends without the means": ch. vi., § 164, p. 201. See J. S. Mill's *Examination of Hamilton*, ch. 24, p. 542 (in 4th edn.): where the *Theodicy* of Leibnitz is explained, as involving restrictions on the power of Providence.

⁶ J. B. Mozley: *Augustinian Doctrine of Predestination*, ch. ii., p. 29.

⁷ A. Harnack: *History of Dogma*, Div. I., Bk. 2, ch. 6, p. 350 of vol. ii. (in English). Origen: *Contra Celsum*, I., 20; and V., 23.

⁸ F. de Vittoria: *Relectiones Theologicae*, X. (De Homicidio), § 6. Compare: "In many cases, the moral good or evil is so intrinsic to the very nature of the acts, that God Himself could not change the radical difference between them": p. 24 of *Moral Principles and Medical Practice*, 4th edn. (St. Louis, 1905); by Prof. C. Coppens (S.J.) of Omaha, U.S.A. (Creighton Medical College).

⁹ Duns Scotus: *Opus Oxoniense*, I., D. 2, Q. 1, Scholium 3.

see, God acts mainly through impressions on the minds of his intelligent creatures.

§ 3. Ockham (†1347) had plainly declared: "Deus non posset": in regard to a Contradiction-in-terms.¹⁰ And the excommunicated Invincible Doctor did not stand alone among Scholastic Philosophers, in limiting Omnipotence to what is not Self-contradictory. He was indeed more chary of theistic limitation, than his more orthodox rivals. For, he asserted the Dispensing power of God over His own Decalogue, and over the "Natural Law" which it embodied. But they were troubled by some conspicuous Hebrew exceptions to the Sixth, Seventh, and Eighth Commandments: Abraham's intention of killing Isaac, Hosea's harlot, and the conduct of Moses to the despoiled Egyptians. The manipulation of these incidents of Sacred History by Thomas Aquinas (†1274) is a very curious instance of early Casuistry.¹¹ Duns Scotus, like the less definite Bonaventura (†1274), drew a radical distinction between the Second Table, which was concerned with interhuman relations, and the First Table, which (being *Circa Deum*) could not be dispensed from without Self-contradiction.¹² Bishop Durand of Meaux (†1334) modified this division by an overlapping distinction between the eight negative precepts, and the two affirmative precepts: to observe the Sabbath, and to honour parents: a distinction having some affinity with that between Duty and Merit. The Affirmative were dispensable; and so was the precept "Non occides" in some classes of cases. "Si verbum, *Non Occides*, generaliter sumatur pro quacunque hominis occisione sic dispensabile: si vero sumatur pro occisione hominis prout eam prohibet *ratio naturalis*, sic etiam illud indispensabile esse."¹³ This fine-drawn subtlety in effect bases that Precept on Natural Equity, and righteously assumes that *Ratio Naturalis* does not condemn killing in self-defence or just public punishment. Vittoria,

¹⁰ "Posse facere omne illud, quod non includit contradictionem fieri": Ockham; *Quodlibeta*, VI., § 1. See also his *S.T. Logic*, I., ch. 15; and *Centiloquium* (Conclusio 5).

¹¹ T. Aquinas: *S.T.*, I.-II., Q. 94, A. 5; *ibid.*, Q. 100, A. 8 (3); and *S.T.*, II.-II., Q. 104, A. 4 (2); *ibid.*, Q. 154, A. 22 (2).

¹² D. Scotus: *Opus Oxon.*, III., D. 37, Q. 1. Bonaventura: *In SS.*, I., D. 47, Q. 4, pp. 845-848 in *Tom. I.*, of the new Quaracchi edition. Albert deals with the Decalogue and *Jus Naturale*, at the end of Q. 80 in Part I. of his *Summa Theol.*: "Meo iudicio haec est falsa, Deus vult fieri mala. Et similiter ista, mala fiunt Deo volente": Q. 80, M. 2, A. 3, Particle 1, *Solutio* (p. 478): vol. xvii. of *Opera*, ed. Jammy.

¹³ G. Durandus: *In SS.*, I., D. 47, Q. 4 (15). The Occamist John Major of St. Andrews (†1540) broadly affirmed the Dispensability of *Non Occides*: *In SS.*, III., D. 37, Q. 10 (14).

though reckoned a Thomist, substantially accords with Durand's opinion of *Non Occides*, and uses for a similar purpose the further qualification, *ex intentione*: "Nam de homicidio non ex intentione, quale est in defensione sui, aut Reipublicae, latior est disputatio".¹⁴ The prevailing Latin opinion is that of Aquinas: *S.T.*, I-II., Q. 100, A. 8 (3): who regards the whole Decalogue as Indispensable, because all is an expression of the Divine Nature. But he eludes the historical and practical difficulties, by a theory of Special Commands which must not be called Dispensations. Suarez (†1617); after giving a critical historical summary of the various opinions, in chapter 15 of the Second Book of his powerful *De Legibus*; finally Resolves in § 28: "Deus in nullo precepto proprie dispensare in Decalogo, aut extra Decalogum". In chapter 6 (§ 11) he had declared: "Dei voluntas, prohibitio, aut praeceptio, non est tota ratio bonitatis et malitiae".

§ 4. The common parrot-chaunter of Divine Omnipotence will be very much astonished, if he should ever take the trouble to search the Scriptures, and find out the very slender and superficial warrant, which Augustine had for his extravagant assumption of Literal and Logical Omnipotence. The epithet *Omnipotent* appears only once in our "Authorised" Bible: *Revelation* xix. 6: "The Lord God omnipotent reigneth". It is translated from the Greek word *Pantokrator*, which is found in nine other passages of the New Testament. All are rendered *Almighty*; and all except one occur in the poetic and rhapsodic Apocalypse ascribed to St. John. The exception is in the *Second Epistle to the Corinthians* vi. 18. *Almighty* is not seen elsewhere in our *N.T.*; but frequently appears in the *O.T.*, and invariably as equivalent to the Hebrew *Shaddai*: 31 of the 48 instances being in the Arabian Drama of Job. In the Septuagint, *Shaddai* is variously represented: usually by *Theos*, *Kurios*, or *Pantokrator*. The last is used in 16 places: all in the poetic and rhapsodic book of Job. *Pantokrator* is not Classical, but Alexandrian Greek: a merely poetic and panegyric word occasionally found in the later contents of the Greek Anthology. Neither *Pantokrator* nor *Almighty* is a correct translation of *Shaddai*, which means Mighty, or Sufficiently Strong: as explained by Moses Maimonides (*circa* A.D. 1190), in his *Guide for the Perplexed* (I., 63). Only in the Book of *Ruth* (I., 20-21) has it been exactly rendered: as, "ho hikanos": The Sufficient. According to the Priestly writer of *Exodus* vi. (3), *El Shaddai* was older than *Jahve*: which was not known to Abraham, or even

¹⁴ F. de Vittoria: *Relectiones Theologicae*, X. (De Homicidio), § 20.

to Jacob. But Wellhausen: in chapter 8 of his *Prolegomena* (339): has given good reasons for holding that Jahve was invoked, long before the time of Moses. The Hebrews had no theological dogma of Omnipotence. Jehovah was merely stronger than the gods of other nations: as Robertson Smith has explained in the Second Lecture of his *Prophets of Israel*; and Canon R. H. Charles in the First and Second Chapters of his *History of the Doctrine of a Future Life*. "The power of God is not assumed to extend to any of these impossibilities": declared Maimonides¹⁵ (*G.P.*, III., ch. 15, p. 279). And Impossibility in particular cases was to him a matter of opinion, subject to legitimate variation. This exposition may have influenced Aquinas: either directly, or through his master Albert, whose acquaintance with Jewish and Arab philosophy led him to become the reviver of Aristotle. But the Angelic Doctor's halting, wriggling, hedging Conclusion on: *Utrum Deus sit Omnipotens*¹⁶ (in *S.T.*, I., Q. 25, A. 3): is quite incompatible with the previous Conclusion (of A. 2): (Dei) "potentia activa est infinita". For, Infinity is meaningless, if coupled with any limitation. To say that, God can do anything which is not impossible, is no explanation of anything. It is a mere evasion of the issue: a pretended definition of an incomprehensible position by means of an ultimate indefinite negative. Our *Almighty* comes directly from the Vulgate: nearly always from *Deus omnipotens*. In some few cases we find plain *Deus*, or *Dominus*. Jerome, and the earlier writers of Latin versions, may have simply made a general use of the most obvious plausible equivalent of *Pantokrator*; or may have been influenced by the courtly style of Vergil, Ovid, and other Latin heathen poets in regard to Jupiter: e.g., *Aeneid*, II., 689; *Georgica*, II., 325; and *Metamorphoses*, I., 154. But nobody will venture to affirm that these poets used *Pater omnipotens*, with the literal and absolute Augustinian significance. They believed as firmly as Aristotle, in the Eternity of Matter: "Ex nihilo autem nihil fit"¹⁷

¹⁵ M. Maimonides: *G.P.*, I., ch. 63, p. 95 in Friedlander's English version. *Pantokrator* means All-Ruling, rather than All-Powerful: something like the Sanskrit *Chakravarti*, or Universal Emperor. *Pagkratēs*, the exact Greek equivalent of *Omnipotens*, is applied to *Zeus* as the beginning of the Hymn of Cleanthes. Also in the plays of Aeschylus: e.g., *Eumenides*, 878: but clearly with poetic license, not in philosophic definition. For, *Zeus* is the slave of Destiny (*Moirā*), like all the other gods of Greek Tragedy: F. A. Paley's Preface to his *Aeschylus*, p. 18.

¹⁶ Aquinas: *S.T.*, I., Q. 25, A. 3. "Ut hominem esse a-inum": is one of his Absolute Impossibilities (A. 3).

¹⁷ "Ek te mē ontos ouden an genesthai": *Physica*, I., 8 (2), line 30. Compare Lucretius: *Rerum Natura*: "nil posse creari de nilo," I., 155-156:

§ 5. "The power of the Creator once recognised as limited": held J. S. Mill:¹⁸ "there is nothing to disprove the supposition that his goodness is complete". And in the weighty words of W. R. Greg:¹⁹ "Half the difficulties which lie in the way of believing in a Personal God, as the Ruler as well as Creator of the Universe, are of our own making. They are wholly gratuitous, and arise out of the inconsiderate and unwarranted use of a single word: Omnipotent." At the opposite pole of philosophy, we find the foremost living Cambridge expositor of Hegel, coming on this practical matter to the same conclusion. "There are many things in the Universe which are intrinsically bad. Such for example is Pain. . . . To use an intrinsically evil thing as a means, when the end could be obtained as well without it, would deprive the agent of all claim to goodness as well as wisdom."²⁰ Every observer of Spiritual Pathology must very well know, that (since the decay of

"neque ad nilum interemat res," I., 216. Also I., 237-239, and 518-519. And II., 287, and 303. After long banning by Theologians, this great scientific postulate seems at last to have got a fair chance of at least a fair hearing. Prof. Soddy, F.R.S., who has played so great a part in the epoch-making discovery of Chemical Isotopes; has now been allowed to expound the truth to orthodox Christians, in the *Modern Churchman* of November, 1919. His *Contribution of Physical Science to Humane Philosophy* boldly affirms (on p. 384 of Part II.), that: "Matter and energy cannot be created or destroyed. The universe is eternal." He goes on to protest, that: "The theist must not push his conceptions of the deity and life into the inanimate universe; and I put the Rubicon between mechanism and life," p. 380. "The idea that physical power is one of the attributes of deity; and the conception of an all-powerful being directing the universe and the physical affairs of men, has left behind it nothing but a legacy of calamity. . . . There is no such being": p. 383. "The evils that this world suffers from are directly traceable to the enthronement of God in the wrong place," p. 384. In regard to Chemical Isotopes, refer to Prof. Soddy's Lecture on the *Complexity of the Chemical Elements*; in *Nature* of 19th and 26th July, 1917: pp. 414 ff. and 433 ff. of vol. 99.

¹⁸ J. S. Mill: *Three Essays on Religion*, p. 252 (Theism, § 5).

¹⁹ W. R. Greg: *Enigmas of Life*, Preface 98. "Non aliunde dissidia in religione pendent, quam ab ignoratione grammaticae": said Joseph Scaliger, the keenest of critics, and the most exact: *Scaligerana*, I., p. 96 in edition of 1740; not 86 as given by Pattison in his *Essays* (I., 155) and *Casaubon* (441). Translated freely: Religious Controversy comes from dullards fumbling with ambiguous words. "Half the controversies in the world are but verbal ones": said J. H. Newman: "and could they be brought to a plain issue, would be brought to a prompt termination. . . . We need not dispute, we need not prove,—we need only define." *University Sermon IX. (On Reason and Faith)*, pp. 192-193. "Grammar is related to Logic, as clothes to the body": said Schopenhauer, in his Criticism of the Kantian Philosophy: *World as Will and Idea*, II., p. 85, in English.

²⁰ J. M. E. MacTaggart: *Some Dogmas of Religion*, ch. vi., § 164, p. 201.

belief in Eternal Fire-Torture), the stupid Stoic heresy of Absolute Omnipotence has been the most fruitful source of doubt, despair, and final disgust with Biblical Religion; on the part of the very men whose nature is most religiously inclined.²¹ The only rational and practical answer to the children's query: "Why does not God kill the naughty Satan": is this. He cannot kill an immortal being; but you will help Him to beat all the devils, if you only keep the Ten Commandments.²² Robinson Crusoe never thought of that, when the same question was put to him by his Man Friday. He could only say that God was so kind, as to give a chance of repentance even to the Great Enemy: quite oblivious of the intermediate agony of billions and trillions of less guilty (if not quite innocent creatures), which must certainly result from entertaining such a phantasy of remote possibility.

§ 6. "One only form of belief in the supernatural,—one only theory respecting the origin and government of the universe,—stands wholly clear both of intellectual contradiction and of moral obliquity. It is that which, resigning irrevocably the idea of an omnipotent creator, regards Nature and Life, not as the expression throughout of the moral character and purpose of the Deity; but as the product of a struggle between contriving goodness and an intractable material, as was believed by Plato; or a Principle of Evil, as was the doctrine of the Manichæans. A creed like this, which I have known to be devoutly held by at least one cultivated and conscientious person of our own day, allows it to be believed that all the mass of evil which exists was undesigned by, and exists not by the appointment of, but in spite of the Being we are called upon to worship. A virtuous human being assumes in this theory the exalted character of a fellow-labourer with the Highest: a fellow-combatant in the great strife; contributing his little, which by the aggregation of many like himself becomes much, towards that progressive ascendancy, and ultimate complete triumph of good over evil, which history

²¹ Compare Prof. Percy Gardiner: *Exploratio Evangelica* (1899), Book I., ch. 5, p. 53: "A very great part of the religious difficulties of educated people arises simply because they do not look at facts in their spiritual life, but start from some *a priori* and unwarranted notions, and fall into disgust and despair, because they find them not suited to the facts of life".

²² See Robertson Smith: *Prophets of Israel*, p. 40 (2nd edition): "The Ten Words, the fundamental documents of the religion of the Old Testament". And Lehmkuhl on Moral Theology in the *Catholic Encyclopædia* XIV., 603: "The Decalogue constitutes the principal Subject-matter of Christian Morality". The reference to *Robinson Crusoe* is Part I., ch. 15 (middle).

points to, and which this doctrine teaches us to regard as planned by the Being, to whom we owe all the benevolent contrivance we behold in Nature. Against the moral tendency of this creed no possible objection can lie: it can produce on whoever can succeed in believing it, no other than an ennobling effect": so wrote John Stuart Mill, the noblest defender of Liberty; regarding the Utility of Religion, on pages 116 and 117 of his *Three Essays on Religion*. It is only to be regretted that he did not put *and*, instead of *or*, after *Plato*. The two suppositions are quite consistent; and both are necessary to complete a rational theory of the Universe, as actually perceived by ourselves. The latter supposition (of an independent Power of Evil) is moreover very far from being peculiar to Mani and his master Marcion. It implicitly pervades all the Hebrew Scriptures, except the Aramaic Drama of Job; and likewise most of the Greek New Testament. It was indeed tolerated (at least) in Christian Theology, down to the general acceptance of Anselm's Theory of the Atonement. The main morbid element of the creeds and cults of Marcion and Mani, lay in their identification of Jehovah with Satan, and consequent invention of a new Anti-Hebrew Divinity.

§ 7. "Evil is as real as good, is as real as life":²³ say all Pragmatists, and every other candid man of action or science. But Augustine *would* have a God of Absolute Omnipotence, and was therefore driven to a brazen Hyper-Stoic denial of the existence of Evil.²³ "Evil be thou my Good": became his motto, in a sense not so very different from that of Milton's Satan. Evil was only Imperfect Good, he asserted; or at worst a Plotinian *Sterēsis*: a merely privative or negative idea.²⁴ Yet some Evil is Pain; and to all of us Pain is the

²³ F. C. S. Schiller: *Riddles of the Sphinx*, ch. x., § 5, p. 310. See further, E. Zeller: *Stoics and Epicureans*, p. 188, in English. And R. D. Hicks: *Stoics and Epicureans*, pp. 42-53.

²⁴ Plotinus on Providence: *Ennead* III., 2, 5, p. 259 (Volkman): "Hotos de to kakon elleipsin ton agathon theteon". See p. 215 of Fuller's *Problem of Evil in Plotinus* (1912). Athanasius: *Contra Gentes*, IV: "Ea vero non sunt, quae mala sunt". Augustine: *Confessions*, III., 7 (12): "Malum non esse nisi privationem boni". Also *C.D.*, XI., 9 (end): "Mali enim nulla natura est, sed amissio boni mali nomen accipit". Likewise *Mor. Manich.*, II., 2: "Malum est . . . deficere ab essentia". Similarly, *De Lib. Arb.*, III., C. 8 (22). For his view of Omnipotence, see *C.D.*, V., 10 (1): "Dicitur enim omnipotens faciendo quod vult, non patiando quod non vult". Indirectly however he admitted Ockham's contention as to Self-contradiction, in his *De Natura et Gratia*, 49: "Nec peccare, . . . nec se negare potest". John Scotus Erigena distinguishes *Privatio* from *Negatio*, as presupposing something positive: "Privatio enim habitudinis est ablatio": *De Divisione Naturae*, III., 5.

most positive thing in the Universe. No other experience impresses itself so deeply, and so fixedly day by day, on every sentient sac of vitality. We do not need to go to battle, and get a bullet in the knee; for a sufficient refutation of the incredible Stoic fatuity revived in the *Theodicy* of Leibnitz, and recently repeated by an Oxford Professor of Moral Philosophy:²⁵ that Pain is a mere privation of Pleasure. We know on the most empiric and trustworthy of all authorities, the Ever-Blessed Sir James Simpson, that: "Pain is *per se* . . . destructive and even fatal in its effects. It exhausts the principle of life".²⁶ He adds emphatically: "Mere pain can destroy life".²⁶ And that is not the worst of it. Death is inevitable sooner or later; and may be a blessing, even if premature. But Pain is always a wanton evil, moral as well as physical, whenever it is not a proportionate punishment. Pain is inconsistent with the healthy exercise of natural

²⁵ J. A. Smith: *On Feeling*, in *Proceedings of the Aristotelian Society* (1913-14), XIV. (N.S.), 71-74. Another Oxford Hegelian, Bernard Bosanquet, admits in his *Value and Destiny of the Individual* (ch. vi.) that: "Pain is a fact," p. 173: but will not allow it to be anything more than "obstruction to activity"; and elsewhere declares it "correlative to contradiction," p. 167. The reference to Leibnitz is: *Theodicee*; *La Bonté de Dieu*, Part II., § 153. Hartmann has truly said: "Pain thrusts itself on Consciousness . . . ; not so Pleasure": *Met. Unconsc.*, XIII., p. 73. And Schopenhauer: "Evil is just what is positive; it makes its own existence felt": *Leiden der Welt* (*Parerga*, § 150). Similarly, in his *Will and Idea*, iv., § 62: "The concept of wrong is original and positive; and the concept of right derivative and negative". And the aged Huxley declared in his last testament of Science: "If anything is real, pain and sorrow and wrong are realities": *Evolution and Ethics* (1893), p. 71.

²⁶ In the *Life of Sir James Simpson*, by J. Duns, p. 253. In a letter dated 14th Nov., 1848 (on p. 215), he indignantly contended: "The true moral question is: *Is a practitioner justified by any principle of humanity in not using it (chloroform)?* I believe that every operation without it is just a piece of the most deliberate and coldblooded cruelty." Nearly three centuries earlier, Ambroise Paré († 1590), the great pioneer of reformed surgery, had written: "Pain ought to be assuaged, because nothing so much dejects the powers of the patient". This is quoted by Simpson on page 82 of his *Anaesthesia and Hospitalism*; along with Galen's aphorism: *Dolor dolentibus inutilis est*. We have since learned from Romanes: *Mental Evolution in Animals* (1883), ch. viii., p. 107: that there is a "quantitative relation between the amount of pain and the degree of hurtfulness". William James, who was a surgeon as well as a philosopher, has added concretely, that Pain is a cause as well as a consequence of Suppuration: in his *Psychology* (1890), vol. ii., p. 612. If pain be prevented by Hypnotism, a burn will not be followed by the usual inflammatory effects. As he justly observes, these new facts throw new light on the self-wounds of Dancing Dervishes, and the *Stigmata* of Visionary Ascetics.

powers, and the healthy play of natural affections.²⁷ Unmerited Pain cannot then come from God. But it is one of the commonest incidents of life in every grade. Therefore it comes because God cannot yet prevent it. He can only enlighten the best men, and inspire them with a holy ardour to find and apply the best means of mitigation. In the new heaven and the new earth: "There shall be no more pain": as we learn from the *Revelation* of St. John xxi. 4.

§ 8. Pain is indeed the most positive thing in the world; and the fear of it is the strongest of all motives in Man and Beast: far stronger than the hope of pleasure. Pain and Pleasure may be logical Contraries, or Counterparts, like Right and Duty; but are certainly not Contradictories,²⁸ like Right and Wrong. The real contradiction or negation of Pleasure is Apathy or Inanity: the real contradiction or negation of Pain being Serenity or Tranquillity: *Anaesthesia* of Body, or *Ataraxia* of Mind. Pain and Pleasure, in the widest common sense, may each counterbalance or nullify the other, in Ethics or Emotion, but not in Physics or Sensation. "Mille piacer non vaglion un tormento": sang Petrarch²⁹ (*Canzon*, 231): "a thousand pleasures are not worth a single grievous pain". The finest wines and dishes can do no more, to extinguish the pain of a broken joint, than to unite the fracture. The systematic substitution of such words as Happy or Glad, and Grievous or Miserable; for the mental conditions commonly spoken of as pleasant or painful; would prevent a great deal of confusion in thought and expression. Delight and Distress would serve well enough as corresponding nouns. Physical Pain (*Odunē*) and Pleasure (*Hēdonē*): the only phenomena to which these com-

²⁷ The good and very experienced Dr. Samuel Johnson wrote to Langton, on a bed of pain, in September, 1783: "Disease produces much selfishness. A man in pain is looking after ease, and lets most other things go." Again, in August, 1784, he wrote of: "A sick man's impatience of the present". And about the same time to Windham: "His thoughts are necessarily concentrated in himself; he neither receives nor can give delight; his enquiries are after alleviations of pain, and his efforts are to catch some momentary comfort": *Life* by Boswell (ed. G. B. Hill), IV., 240, 361-362. It is even said that he once went so far as to exclaim: "Every sick man is a villain".

²⁸ "Painful feeling in a certain sense has a positive opposition to Pleasure; for it is its contrary, and not its mere contradictory": *General Metaphysics* by John Rickaby, S.J., I., ch. 4, p. 147. Cf. Bain: *Emotions and Will*, ch. i., §§ 11, 12.

²⁹ F. Petrarca (†1374): *Canzoniere* 231 (Salvo-Cozzo); or I., 176 (Volgata). Compare Grant Allen: *Physiological Aesthetics* (1877), ch. i., § 3, p. 26: "Our greatest Pleasures fall far short in intensity of our greatest Pains". William James speaks highly of this neglected book, in his *Psychology*, vol. i., ch. 5, p. 144.

monly contrasted terms can be consistently and lucidly applied: are distinct positive affections of the Sense of Touch; and that is the fundamental sensibility (*Sensus Vagus* or *Communis*), of which Sight, Smell, Taste, and Hearing, are the most conspicuous special manifestations. Aristotle put this very clearly in regard to Taste, in his *De Anima* (III, 12); and hinted as much in regard to the other Special Senses in the following chapter (13): "Without Touch (*Haphê*) there can be no other sense". Hamilton has followed this lead in his *Metaphysics* (II, 522): "All sensible cognition is, in a certain acceptance, reduced to Touch, and this is the very conclusion maintained by the venerable authority of Democritus": as recorded by Aristotle in his *De Sensu*, ch. 4 (p. 442a, 29). Hobbes had already said in his *Human Nature*, ch. 2, § 4: "The immediate cause of sense or perception consists in this, —that the first organ of sense is touched and pressed". And Bain says without reservation: "Touch is the fundamental and generic sense, the firstborn of sensibility, from which, in the view of Evolution, all the others take their rise": *Emotions and Will*, ch. vii., § 4. Pain (properly so called) may be further explained, with general sufficiency, as the effect of excessive pressure on the afferent nerves; though Hartmann: in his very physiological *Philosophy of the Unconscious* (A., ch. 7, and B., ch. 4): maintained that even without nerves Sensation is possible.³⁰

§ 9. Theology, Moral and Dogmatic, still festers from the famous attempt of Plotinus, Athanasius, and Augustine; to evaporate the mystery of Evil by calling Evil, "Imperfect Good". The Neoplatonic Augustinian Negation was equally accepted by Proclus, the last of the Great Pagans († 485). He says near the beginning of his *De Malorum Subsistentia*: "Etenim qualiter esse hoc possibile, quod omnino est expers principii . . . Nusquam entium oportet malum esse". And at the very end: "Faciunt Dii malum, sed tanquam bonum":³¹ imitated perhaps by Ockham, in his, "vult (Deus) mala, non

³⁰ Hartmann: *Phil. Unc.*; vol. i., p. 173; and vol. ii., 147, in English.

³¹ Proclus: *Opera*, ed. V. Cousin, vol. i., pp. 198 and 288. Ockham: *Quodlibeta*, III., § 2. Neo-Platonism, as Milman (*E.C.*, II., 323) said of Manichaeism, was a "vast Eclecticism". Its composition has been fully (if sometimes questionably) set forth in Harnack's Third Appendix to the First Book in the First Division of his *History of Dogma*; vol. i., pp. 336-364, in English. It was a misty and moonshiny farrago of pernicious perversities: like The One, The Absolute, and The Dignity of Man: drawn mainly from Platonism, Stoicism, and divers Oriental Cosmogonies. No serious Greek Philosophy was entirely banned, except that of the lucid, just, and practical Epicurus: the true Ethical Epigonus of Aristotle, although regarded as antipodal in the Middle Ages.

tamen vult *malé*". The Pseudo-Dionysius of the early Sixth Century borrowed copiously, not only the ideas, but the very phrases of Proclus; and thus they became part of Christian Philosophy even down to the Nineteenth Century, though exposed in the Fifteenth by Laurentius Valla. The recent investigations of Hugo Koch at Tübingen (1895), and Joseph Stiglmayer at Innsbruck (1898), have shown that a large part of Ch. IV. in the *De Divinis Nominibus* of the Anachronic "Areopagite" has been bodily transferred from the *De Malorum Subsistentia* of the Byzantine Hegel.³² Much also has been incorporated there and elsewhere, from other works of Proclus; especially his *Institutio Theologiae, Theologia Platonis*, and Commentaries on the *Timaeus* and the *Parmenides*. "Providentia est in omnibus, malum igitur secundum se non est": wrote the Pseudo-Dionysius in his *De Divinis Nominibus* (IV., § 3). "God's in His heaven, All's well with the world": a world containing at least a million of lepers, even in the Age of Proclus; and more than twice as many victims of Cancer, when Browning wrote *Pippa Passes* in his youthful complacency.

§ 10. Anselm indeed practically confined that negative character to Moral Evil (*Malum Injustitiae*). This he distinguished from *Malum Incommoditatis*, which might be positive in some forms, such as *Dolor et Tristitia*.³³ But down to the Nineteenth Century, Trinitarian Theologians got no further. In this respect indeed, the Reformation was even Reactionary; and Leibnitz less "Enlightened" than the "barbarous" Scholastics whom he derided. The Devil was regarded as acting by God's permission, or even as His roundabout agent. And all pain was to be accepted as "God's will"; till Maurice (in 1853) boldly joined forces with Simpson, and protested that: "Pain is an evil and comes from an enemy". . . . "Hold fast that conviction," he insisted, ". . . Pain is the consequence of disorder, . . . a bondage, a sign that some tyrant has intruded himself into this earth of ours."³⁴ A quarter of a century later, Herbert

³² See the *Catholic Encyclopædia*, V., 18. The *Institutio* of Proclus has very lately (1918) been translated into English by A. C. Ionides: as *The Elements of Theology* (Natural). Like the *Ethics* of Spinoza, it is mathematically arranged.

³³ Anselm: *De Casu Diaboli*, 26. Kant draws a similar distinction between Pathological and Moral Pleasures, in the Preface to his *Metaphysical Elements of Ethics: Works* (ed. Rosenkrantz), VIII., 222: Abbott's Translation, 289. But he refused the name of *Evil* to anything, save an infraction of a Categorical Imperative.

³⁴ F. D. Maurice: *Theological Essays* (1853), IV., 61-67 in 2nd edn. St. John's Gospel speaks thrice of the evil power of the Prince of this

Spencer formulated broadly: "Pain is the correlative of some species of wrong".³⁵ And half a century later, the Pauline Sir William Ramsay admitted: "We are all in some way aware, that evil is wrong because it is painful".³⁶ On the side of rational jurisprudence, Bentham was even more intensive and comprehensive than Spencer. "Pain is in itself an evil, and without exception the only evil."³⁷ And he built on a solid basement in the *Ethics* of Aristotle: "Pain is evil and ought to be avoided".³⁸ The controversy has been clearly summed up by Henry Sidgwick, the most judicial of modern philosophers, at the close of his *Lectures on Kant*.³⁹ "Kant's notion of *Ens Realissimum* is to be identified with the theological notion of God, and to have all the moral attributes of Deity." This "assumption of the compatibility of all positive predicates, made in the formation of this Transcendental Ideal, requires us to hold—what Leibnitz of course did hold—that Evil, moral and physical, is a merely negative attribute. But I can see no reason to suppose this. Physical pain seems to me as positive as pleasure; and though much moral evil is doubtless analysable into mere defects or negations of positive quality, I do not find this conceivable in all cases, as for example in the case of pure malevolence."

§ 11. Yet, in spite of all these weighty Testimonies, to the Blessed Truth of God's will for the harmless happiness of all His sensitive creatures: we are still in grave danger from a Clerical-Legal-Medical conspiracy for booming the "Moral

World; xii. 31; xiv. 30; and xvi. 11. Satan's "Existence seems a reasonable postulate, which best helps to explain the mysterious problem of Evil": wrote Dr. A. Smythe Palmer, on *The Fall of Lucifer*, in the *Hibbert Journal* of July, 1913, p. 766. Even F. H. Bradley does not regard devils as impossible: *Truth and Reality*, 440 (n.). Refer also to his *Appearance and Reality*: chaps. 25 and 26.

³⁵ H. Spencer: *Data of Ethics* (1879), ch. 15, § 101.

³⁶ Sir W. M. Ramsay: *Cities of St. Paul*: (1907), p. 18. Compare Harnack: *What is Christianity*, IV., 60: "He (Our Lord) nowhere says that disease is salutary, and that evil is a blessing. . . . To Him all evil, all misery, is something terrible; it is part of the great realm of Satan."

³⁷ J. Bentham: *Principles of Morals and Legislation*, ch. x. (Motives).

³⁸ Aristotle: *N.E.*, VII., 14: "Λυπὴ κακὸν ὁμολογεῖται καὶ πηκτον". According to Plato (in the *Protagoras* 354-355), the doctrine of Bentham had previously been asserted by Socrates, and admitted by Protagoras: "And even now, if you see any possible way in which evil (*kakon*) can be explained as other than pain (*ania*), or good (*agathon*) as other than pleasure (*hēdonē*), you may still retract. But I suppose that you are satisfied at having a life of pleasure which is without pain (*hēdeōs katabiōnai ton bion aneu lypōn*)": Jowett's Translation, I., 164.

³⁹ H. Sidgwick: *Lectures on Kant*, XII. (on Rational Theology), pp. 194-195.

Value of Pain," and even the "Beneficence of Disease": under pretence of the Supersanctity of Human Life. And Prof. Coppens (S.J.) of Omaha does not scruple to assume, that: "All the venereal diseases are there, to act as ministers of Heaven's justice, anticipating, and often mercifully averting, the punishments of the future world".⁴⁰ No preaching was ever more diabolical; since Augustine's argument in his *De Libero Arbitrio*:⁴⁰ that Sin itself; as well as the unmerited agonies of Birds, Beasts, and Babies; was contributory to the Perfection of the Universe! The callous may sometimes indeed be softened by a month of meditation on a bed of weakness. But where is the man who was ever morally improved by suffering amputation: because he got no chloroform? The truly pious Medical Professor George Wilson of Edinburgh, who suffered thus in 1843, wrote (on the contrary) in a long-subsequent letter to Simpson, of the: "Black whirlwind of emotion, the horror of great darkness, and the sense of desertion by God, . . . which . . . I can never forget".⁴¹ An experience of helplessness may lower the rampancy of human pride, but no pain can be morally remedial, unless honestly understood as the consequence of the sufferer's definite wrongful conduct, and firmly associated with such conduct for the future. Pain can have no moral value, apart from fair and clearly-consequent punishment.

§ 12. The Antinomian Rogue's Religion has few more effective weapons than the 45th verse of the Fifth Chapter in Matthew's Gospel: the first chapter of his compilation commonly called the Sermon-on-the-Mount: "He maketh His sun to rise on the evil and the good, and sendeth rain on the just and the unjust". This triply fallacious text is bad science, bad morality, and (in view of the Old Testament) bad Theology. Let us take the last first. In *Leviticus* (xxvi. 4) and *Deuteronomy* (xxviii. 12), Moses is the vehicle of a promise: "If ye walk in my statutes and keep my commandments, and do them, then I will give you rains in their season". In the First Book of *Kings* (viii. 35) and Second Book of *Chronicles* (vi. 26), we learn from Solomon's Prayer on the brazen scaffold: "Heaven is shut up, and there is no rain, because they have sinned against Thee". And in his Book of *Proverbs* (xi. 31) he proclaimed: "Behold the righteous shall be recompensed in the earth: much more the

⁴⁰ Coppens: *Moral Principles and Medical Practice*, p. 117, 4th edn., 1905. Augustine: *De Lib. Arb.*; III., ch. 9, § 26; and ch. 3, §§ 68, 69.

⁴¹ *Memoirs of George Wilson, M.D.*, by his sister; ch. vii., p. 297 ff. Given also by Duns: *Life of Sir J. Y. Simpson*, pp. 262-269.

wicked and the sinner". Isaiah (v. 6) threatened Judah: "I will command the clouds that they rain no rain upon" (my vineyard). Ezekiel (xxii. 24 and 26) prophesied against Jerusalem: "Thou art a land that is not cleansed, nor rained upon in the day of indignation. . . . Her priests have done violence to my law. . . . They have put no difference between the holy and the common." Amos (iv. 4) tells us that Jehovah, for reasons of righteousness: "caused it to rain upon one city, and caused it not to rain upon another city". And before Jehovah destroyed the Cities of the Plain, the One Just Man was warned to take away his family.

§ 13. It is bad Science, because any discrimination between good men and bad, in the matter of rain or sunshine, is physically impossible. It is practically, if not formally, equivalent to a Contradiction-in-terms; which even the most orthodox Scholastic philosophers generally treated as exclusive of Divine Omnipotence. The Just and the Unjust are so closely intermixed in space, time, life, and action; that material movements, of any considerable scope, are inconsistent with moral treatment of individual centres of sensation and subjects of vice or virtue. This is clearly admitted in such proverbs as: "The fathers have eaten sour grapes, and the children's teeth are set on edge": *Jeremiah* xxxi. 29; and *Ezekiel* xviii. 2. The Just and the Unjust may be of one blood. They sleep in the same bed, and sit at the same table. They walk abreast on the same pavement, and drive abreast in the same chariot. No effective or appreciable rain could fall from a patch of cloud-vapour, small enough to cover one person without covering his companion; or even small enough to cover one of two adjoining allotment-gardens without covering its neighbour. The rain falls, and the sun shines, at the same time on the good and the bad, because these things could not happen otherwise.⁴² Physical evil befalls the righteous, and physical good is enjoyed by the wicked, because God cannot directly prevent such happenings. He can modify them only through Secondary Causes; mainly by working on mundane (and other subordinate) intellects, against the "blind forces of Nature," and the machinations of the Powers of Darkness. "Because sentence against an evil work is not executed speedily, therefore the heart of the sons of men is fully set in them to do

⁴² As pointed out by Seneca: *De Beneficiis*, IV., 28: "Di quoque multa ingratu tribuunt, sed illa bonis paraverunt: contingunt etiam malis, quia separari non possunt. Satiusest autem prodesse etiam malis propter bonos, quam bonis deesse propter malos. Itaque quae refert diem, solem (etc.) . . . pro universis invenerunt: excerpere singulos non potuerunt."

evil": exclaimed Solomon, in *Ecclesiastes* viii. 11. Can Archbishop D'Arcy, or anyone not cursed with a heart of icy ironstone, really believe that a good, omniscient, and omnipotent Heavenly Father, could have allowed the frigid and calculating monster, Richard Justin of Belfast, to go on for weeks and months (in 1909) slowly killing his little daughter, with crafty beatings arranged to conceal the evidence of murder? Is it not more reverent: in every way more truly pious: to believe that He is frequently baffled, in trying always to do the best He can? Is mere Power more worthy of our adoration (and ascription), than Justice and Lovingkindness? Does it not savour more of cringing to Mumbo Jumbo, than of looking up to Jehovah the Just?

§ 14. Finally, the text is bad Morality; because an omnipotent (or satispotent) Spirit, who so acted, could not be a "Moral Governor of the Universe". He would be cultivating Wrong; because, consequences being equal, men will generally prefer the pleasures of wickedness to those of an approving Conscience. The facts of life, as we see them every day, are the best proof; that, being Good, he cannot be Omnipotent. Men would soon cease to cheat, or be cheated, by means of Matthew's ungodly jingle of Sentimental Iniquity;⁴³ if the necessary and more perspicuous corollary were always appended: "He smiteth alike with cancer the harlot and the virtuous housewife, and sendeth His leprosy equally upon the robber and the honest husbandman whom he robbeth". Both of these common and terrible afflictions are indisputably unmitigated evils, with whose ordinary incidence no sin can rationally be associated. Their causes are quite unknown, though vaguely spoken of as Microbes, by Metschnikoff and other disciples of Pasteur. The same may be said of two other, and still more common, painful putrefactive diseases: Tubercle and Dental Decay. Tertullian, in his *Contra Marcionem* (II., 17), falsely charges Marcion with erasing this text from Luke's Gospel: which never contained it: in order to disparage the "Catholic goodness" of Jehovah. It may have been borrowed from Seneca, and inserted in the Gospel of Matthew by some opponent of Marcion, who did not understand Seneca's irony; just as the Johannine Comma was interpolated in the First Epistle of

⁴³ Compare the similar earlier sentence of Seneca († 65 A.D.): *De Beneficiis*, IV., 26: "Si deos imitaris, da et ingratiss beneficia; nam et sceleratis sol oritur, et piratis patent maria". The sentiment is not his own; but is unfairly put into the mouth of an Epicurean adversary, whose "Gods" were avowedly Indifferent. Seneca goes on to controvert it in chaps. 26, 27, 28; as an *interrogatio insidiosa*. It is rather Hyper-Stoic than Epicurean.

John (v. 7) by some ardent "Athanasian". It looks also like an apologetic inversion of Solomon's lament over the ineffectiveness of Providence, in *Ecclesiastes* (ix. 2): and an anticipation of Tertullian's own well-known artifice of controversial effrontery. It does not occur in the Gospel according to the Hebrews (so far as extant); nor in the works of Hermas and the Apostolic Fathers, except once in the Long (and late) Recension of the Ignatian Letters: in the greatly enlarged Epistle to the Philadelphians, under the heading, *Avoid Schismatics*. Justin Martyr indeed quoted it with regard to sunrise, but not to rainfall: in his *First Apology* (15). It appears fully however in the *Diatessaron* (IX., 14) of Justin's errant pupil, the Assyrian Gnostic Tatian, perhaps as early as A.D. 160. It was afterwards frequently quoted by Irenaeus. Otherwise the Fathers do not seem to have made much of it; if we may judge from the Aquinian *Catena Aurea*, which the English reader may consult in Mark Pattison's translation. Hilary suggested an allegoric explanation: Sun and Rain referring to Baptism with water and the Spirit: *In Matth.* IV., § 27: Migne, *P.L.*, IX., 942.

§ 15. There is indeed a fifth very common disease of the same class described in the previous section: perhaps the most loathsome (if not the most agonising) of all: which has long been regarded as not only propagated, but originated by irregular gratification of the Reproductive Impulse. It is an indisputable fact, that the infection of Syphilis can generally be traced to fornication: though never to Seduction, and very seldom to Rape or even Adultery. But its ultimate genesis we must admit to be still really unknown. And a full and candid examination of the relevant facts, in the light of Divine Justice, will not support the theory of celestial punitive interposition. Even a Just Human Judge would rather allow two guilty to escape, than one innocent to be involved in their misery, and stamped with their disgrace. But on the average, for every loose man who suffers from Venereal Disease, far more than one innocent wife or baby is poisoned with Death-in-Life. Half of the female patients in Lock Hospitals are helpless creatures of distinctly feeble intellect: says Dr. A. F. Tredgold in the *Times* of 10th May, 1918. And in nine cases out of ten, the congenital defects and deformities, which make Life a Curse, are the causal consequences of such contagion, through hereditary infection. A leading article in the *Times* of 23rd September (1919) has neatly summed up the case against the Medical Monopolist, who is so eager to prevent the continued use of those

"prophylactic packets," which have done so much to save the health of the army. "It is idle to urge reasons of morality, for the simple reason that the innocent suffer with the guilty. . . . It may be taken as established that the diseases cannot be stamped out by exhortation. They can be stamped out only by building a barrier between the infected and the uninfected." Many years ago, I heard a sanguine surgeon saying that Syphilis could be stamped out in six months, by a resolute International Quarantine. But alas! there is no disease, which so easily becomes an instrument of Extortion;⁴⁴ and none, with the possible exception of Cancer, which yields a greater profit to the practitioner. Further enlightenment may be found in the *Nineteenth Century* of September 1917, January 1918, and July 1918; where Sir Bryan Donkin (Medical Adviser to the Prison Commission), and Mr. Hugh Elliot (translator of Lamarck), have made crushing exposures of the callous cant of the Molochite Mawworm whose bigotry plays into the hands of the Professional Profiteer. After all that can be said on any side, the last word of Divine Morality must remain: "No Sin can exceed the *Toleration of agony to the Innocent*, except its deliberate infliction".

§ 16. And even if the actual fornicator were the only sufferer, the penalty would not fit the different grades of this class of offences. The Universal Father is Just; and with Him, as with Aristotle (*N.E.*, V., 6): "all Justice is a matter of Proportion". But this imagined Judgment of God on Impurity never smites the Seducer, and very seldom the Adulterer; both of whom are a hundredfold more sinful than the common fornicator: not to mention the ravishing ruffian, who is tenfold more wicked than either Adulterer or Seducer. On him at least no decent man would waste his pity; or judge him in any case overpunished by castration. But the doom of chronic disease and domestic disability would be atrociously excessive, and therefore clearly unjust, for most of the actual immediate sufferers. A frequent collocation, or temporal coincidence, is a very different thing from a chain of natural causality: such as we can see between salacious excess, and some functional disorders of the nervous system, which have no morbid physical effect on anybody but the actual offender. As Delirium Tremens falls upon the

⁴⁴ See a letter signed "Fair Game," in the *Times* of 12th August, 1912 (p. 2). He was urged into a *Nursing Home* for six weeks by a Specialist. Two guineas were charged for each perfunctory visit, made thrice a week at the same time to all the patients. It was a chronic case, requiring no isolation, and receiving no surgical treatment whatever.

Drunkard; so is the debauchee withered by General Paralysis, and racked by Locomotor Ataxy. Infection and Contagion of any kind are generally inconsistent with Justice, and therefore cannot be tolerated by the Universal Father: whether he be considered creative or adoptive. They flourish, because he cannot yet root their germs out of this world. For the present, he is restricted to enlightening mankind, and inspiring his chosen agents to the necessary measures of mitigation and prophylaxis; in the hope of ultimately acquiring such control over still intractable matter, as may at last lead to the extermination of the seeds of evil. The casual and capricious prevalence of the Five Great Rotting Diseases, plainly cannot be reconciled with Justice or Fatherly Goodness. And Augustine's theory, that God permits nothing which He does not will, must therefore be execrated as making Jehovah no better than Satan. In effect he reaches Marcion's outspoken conclusion, but by a roundabout and underground passage.

§ 17. The conversion of the Friend-God of the Fourth Gospel, into the Fiend-God of the Fourth Century, was effected mainly by the great Ascetic movement which Athanasius and Jerome carried from Egypt to Rome. But it was powerfully aided by the wide permeation of Marcionite and Manichaean misconceptions of the God of Moses: even among those who regarded the names of Mani and Marcion with indignant horror. The two divergent streams of Ultra-Paulinity, having their adjacent sources in Marcion and Montanus, were ultimately united in Augustine: the former flowing through Mani, and the latter through Tertullian. "Augustine's system is in truth that of the Gnostics, the ancestors of the Manichees": said Canon Bigg in his *Christian Platonists of Alexandria* (p. 289 in first edition or 339 in second). . . . "It is Gnosticism without the consolatory belief in Conditional Immortality" (p. 290 or 340). "The vast eclecticism of Mani," as Milman calls it in his *Early Christianity* (II., 323), was Marcionite in so far as it was Christian. "The true descendants of Marcion were certainly the Manichaeans": decides Dr. F. C. Conybeare in his illuminating Introduction to the Armenian *Key of Truth* (p. 131). Augustine was Punic to the backbone; and he must always have been influenced (at least unconsciously) by the Mesopotamian beliefs, which he held for not less than nine years, before he professed (after three or four years of hesitation) to become a "Catholic" under the teaching of Ambrose.⁴⁵ Or

⁴⁵ See Beausobre: *Histoire du Manichéisme*, vol. i., p. 227 (ch. 9 of Preliminary Discourse to Part II.). On p. 231 he gives the formulas of

he may have been driven in the same direction, by the same spirit of resentful bravado, which led Tertullian⁴⁶ to glory in the "ineptitude" and "impossibility" of his dogmas. He dragged some of the worst of his Manichaean⁴⁷ notions into the new African Syncretism of man-worship and devil-worship, which he cloaked with the forms and phrases of Catholic Christianity; and he aggravated their evil in the process of adjustment. He rejected indeed Mani's over-emphatic Duality of World-Forces,⁴⁸ and the connected creation of mankind by

Abjuration required from the Manichees by Catholics. On p. 283 he says: "Les Pères n'ont pas toujours bien défendu le Vieux Testament". Secundinus, Augustine's Manichaean friend, reproached him with "Carnalis timor" and "Cupiditas honoris": A. *Contra Secundinum*, 1 and 2. His breach with the disciples of Mani indeed followed quickly on the issue of a persecuting edict (in A.D. 381), by that mighty friend of Ambrose, the ferociously orthodox Emperor Theodosius I.: *Theod. Code*, XVI., Tit. 5, ch. 7. And his book on the *Morals of the Manichaeans* is highly suggestive of the bluffing deserter. Its horrible charges have no support in the writings of any other "Father," except in the *Catechesis* of Cyril of Jerusalem (VI., chaps. 33 and 20): who was only a youthful retailer of partisan gossip, when he wrote *circa* 347. Archelaus makes no allusion to them, though quite ready to be openly abusive: telling Mani on one occasion that he was more like a Parasite than a Paraclete: *Acta Archelai*, 22. Paul the Persian (Christian) was more polite to the Manichaean Photinos at Nisibis in 527: even addressing him as Friend: *Disputes of P.P.*, in Migne (P. Gr.), vol. 88, p. 555. Augustine made no attempt to justify his libels, when challenged by Fortunatus in 392: *Augustin, Contra Fortunatum*, 2. They were exactly what the vulgar Pagan used to say about every sort of Christian: "Thyestian banquets and Oedipodian promiscuity": as Eusebius has told us in Book V. (ch. 1) of his *History*. They are entirely discredited by Beausobre: Book IX., ch. 8, p. 728 ff. See also N. Lardner's *Credibility of the Gospel History*, Part II., ch. 63, §§ 1 (6) and 4 (18). Mani seems to have disbelieved the Eternity of Future Punishment: Lardner's *Works*, III., 478.

⁴⁶ Tertullian: *De Carne Christi*, 5: "Natus est Dei Filius; non pudet, quia pudendum est: Mortuus est: prorsus credibile est, quia ineptum est: et sepultus resurrexit: certum est, quia impossibile". No famous phrases are more frequently misquoted: the latter two clauses being generally jumbled into one, and the word *absurdum* interpolated. He had, just before, vaunted himself as "bene impudens" and "feliciter stultus". See also his *De Baptismo*, 2; for a similar line of disputation. Compare Anselm (*Proslogion*, ch. 1): "Credo, ut intelligam". And Augustine (*Sermo*, 43, § 7): "Ut intelligas, crede".

⁴⁷ The greatest Pelagian writer, Bishop Julian of Eklanum (*circa* 420): "pointed out the traces of a Manichaean type of thinking in Augustine": Harnack, *History of Dogma*, vol. v., p. 187 (in Eng.). He indeed identified Augustinity with Manichaeism: "Sub laude baptismatis eructat Augustinus Manichaeorum sordes ac naturale peccatum": quoted by Augustine in his *Opus Imperfectum contra Julianum*, I., 9. See Harnack's Note: *H.D.*, vol. v., p. 203 (Eng. Tr.).

⁴⁸ Which however was quite consistent with Plato's later theology, in the *Laws*. See Gomperz: *Greek Thinkers*, III., 213 ff. (Book V., ch. 19). On p. 267 (ch. 21), Gomperz declares: "Without Plato there would have been no Augustine".

the great Power of Evil. But he reverted to Marcion, in making the celibacy and other privations of Mani's rare and voluntary Elect,⁴⁹ the Ideal, if not the Duty, of every Christian who had been baptised. The absolute wrongfulness of killing anything, under any set of circumstances, was one of the most conspicuous characteristics of the Manichaean Decalogue;⁴⁹ and Augustine only added a sinister intensity to its effectiveness, by restricting the scope of the veto to human beings.

§ 18. Like Mani, Augustine adopted substantially Marcion's attribution of Canaanite cruelty and caprice to the Hebrew Divinity; and for this indeed they had some excuse, in the presentation of His policy made by the Edomite or Midianite author of the Drama of Job: a policy so different from the Providence of the True God of the Old Testament, who pains only to punish.⁵⁰ "Behold the righteous shall be recompensed in the earth: much more the wicked." The author of *Job* does not once refer, even indirectly, to the law, religion, or history of Israel. The book was probably written in Arabic, and translated into Hebrew mixed with Aramaic, during the Babylonian Captivity. Canon Driver, though admitting all this, nevertheless maintains in his *Introduction to the O.T.* (p. 434, 8th edn.), that: "The entire work is manifestly a genuine product of the religion of Israel". But the Inspiration of *Job* was denied by Theodore of Mopsuestia, the great exegete of the Fourth Century, who led the Nestorians to exclude it from the *O.T.* Canon: "quod pagana sapiens hunc librum conscripsit".⁵¹ Luther, who translated it in 1524, "declared *Job* to be an allegory": says his recent biographer, Preserved Smith (p. 268). Moses Maimonides († 1204) had favoured the same suggestion in his *Guide to the Perplexed*, Part III., chaps. 22, 23, 24. It is quite probable that Muhammad took his notion of Allah from the Book of Job; especially from the very Aramaic speeches of Elihu: though he always professed to be merely reviving the religion of Abraham, and at one time intended to make

⁴⁹ The Elect or Perfect dared not end the life of even a plant: Augustine, *Contra Faustum*, VI., 4; and *Morals of the Mani heretics*, XVII., 54, 57. They were vegetarians and abstainers from wine. There were only seven of them in Mani's own time: *Acta Archelai*, 10. See N. Lardner: *Credibility of the Gospel History*, Part II., ch. 63, 1 (5). And Harnack's *History of Dogma* (in Eng.), III., 327 (Appendix on the Manichees).

⁵⁰ *Proverbs*: xi. 31. The long chapter 28 of *Deuteronomy* may be described as a sermon on this text. See also *Deuteronomy* vii. 9.

⁵¹ Migne: *P. Gr.*, 66, p. 697. And Harnack's *History of Dogma*, Div. II., B. I., ch. 1, p. 193 of vol. iii., in English.

Jerusalem his centre of worship. He certainly borrowed his condemnation of Suicide from the Canaanite "Christianity" of Chrysostom and Augustine. But it is qualified by the word "wantonly" in the *Koran* (IV., 33). The opposition of Hebraism to all neighbouring cults (Semitic, African, or Mongolian) is emphatically stated by Robertson Smith in his *Religion of the Semites*, especially pp. 4 and 194.

§ 19. But Augustine eluded Mani's consequent repudiation of the Old Covenant, by compounding Jehovah with Moloch into a new Supreme Deity: a Pseudo-Theos of the New Testament, whose chaotic and elastic inconsistencies were shrouded in the word-play of Stoic Pantheism, and Platonian poison-juggles of the Infinite and the Absolute. Old and New Biblical stock-phrases were ingeniously distorted, to palter in a double sense. Satan reappeared, not exactly as an angel of light, but as an over-zealous agent and instigator⁵² of Caligulan caprice, on the part of the newly invented "Almighty". "Africa, not Rome, gave birth to Latin Christianity": declared Dean Milman in his classic *History* (L.C. vol. I, ch. i., p. 27). Under cover of Augustine's Procrustean Synthesis of Good and Evil, the cult of the Phoenician fire-fiend crept into the clothing of Christian Tradition; and Punic Neo-Molochism became for fourteen centuries the strongest factor in the religious muddles of Latin and Teutonic Christendom. Dean Inge (of St. Paul's) has lately said that: "Christianity is, and must remain, a composite creed, an amalgamation of opposite types of belief".⁵³ That is true

⁵² Dr. A. B. Davidson on *Job* in the *Cambridge Bible for Schools*, ch. 2. Also his *Theology of the Old Testament*, IX., 3, pp. 300-306. And Driver's *Literature of the O.T.*, 412 and 432-434. For the relations of Augustine to previous and subsequent Christianity, see Dr. Allin's very outspoken and clarifying *Augustinian Revolution*, prefaced by Chancellor Lias. For light on his character, see also Miss Wedgwood's *Moral Ideal*, 413 to 448; and Paulsen's *System of Ethics*, I., ch. 2, § 3, p. 69, in Eng. Tr.

⁵³ W. R. Inge: *The Parting of the Roads*, 4. *Ibid.*, 11: "A vast quantity of crude Pagan superstition was incorporated in Catholicism". See also Gwatkin's *Early Church History*, II., 140 and 355. And Cumont's *Mysteries of Mithra*, pp. 191-196. Sunday became the Lord's Day in place of the Sabbath, and Mithra's anniversary in midwinter was celebrated instead of the real autumnal birthday of Jesus Christ. The current traditional symbolic use of the Cross was undoubtedly a compromise with the soldiers of the Sun-God. For, the Early Christians naturally abhorred the upright penal *Cruz* (Greek *Stauros*), as the instrument of their founder's ignominious agony. "Cruces etiam nec colimus, nec optamus": wrote Minucius Felix, in ch. 29 of his *Octavius* (circa 170). We hear of no Crucifix before the Fifth Century. Their baptismal sign was merely the first letter of *Christos* in Greek: the St. Andrew's (or decussate) cross, which was certainly not set up on Calvary. The tolerant and eclectic Constantine, who abolished crucifixion, was a Mithraite bred in

of the Present, and most of the Past : but not, let us hope, of the Future. I repel the necessity of his "must remain". The True Primitive Christian was the True Hebrew, who had crowned the Faith of Abraham and the Law of Moses with the Messiahship of the Galilean Christ. The main accretions to this Nazarene Jehovism have been Mithra-worship, Man-worship, and Moloch-worship. If we cannot get back to the reign of Tiberius, let us at least get rid of everything Punic, and most things Pelusiote or Pessinuntian. "The Church," says Harnack (*H.D.*, III., 139), "has produced two fundamental systems; Origen's and Augustine's." Let us begin by rejecting the Carthaginian Latin, while we stand by the Palestinian Greek.

§ 20. The Reformers (except Luther) altered rather the outward expression, than the inner spirit of the self-torturing sycophant; grovelling before Moloch-Jahve,⁵⁴ the Augustinian monster. The religion of Calvin and Cartwright and Candlish, of the Synod of Dort and the Westminster Assembly, was a Cultus of Terror; not less than the religion of Anselm and Aquinas, of the Inquisitors of Spain and the Self-Tormentors of Port Royal. Jonathan Edwards,⁵⁵ and the "Evangelical"

frontier camps, and was baptised only on his deathbed. But Theodosius was a morose Punic-Iberian, who burned his officers alive for inconvenient errors of judgment, or even for too faithfully recording decisions which he afterwards wished to disavow. See Strachan Davidson's *Problems of Roman Criminal Law*, II., 184-185.

⁵⁴ Tertullian (*De Fuga*, 1 and 10) introduced the theory that Persecution of the Righteous came from God: "Ergo et malum a Deo, et delictum a Deo: nihil jam in diabolo, nihil etiam in nobis ipsis". But Cyprian, Dionysius, and Athanasius (*De Fuga*, 23) defended the primitive view, that it came from the Devil: though Athanasius was deeply infected with the Egyptian virus of self-mortification. See also Plutarch: *On the Decadence of the Oracles*, 14, 15, 21. Tertullian's theory was less inconvenient for Augustine, as the Father of Pious Persecution: "Grand Patriarch of Christian Persecutors": in the well-deserved words of Barbeyrac (*La Morale des Peres*, XVI., p. 304). Dollinger, in his *Religious Freedom* (p. 233 of his *Hist. and Lit. Addresses in Eng.*), spoke with just severity of Augustine's "Palpable sophisms, and gross perversions of the utterances of Christ and the Apostles": when writing against the Donatists, whose persecution he not only justified but instigated: *Contra Petilianum*, II. and III.; and *Epist.* 93 (*Ad Vincentium*) and 185 (*Ad Bonifacium*). Milman in his *Latin Christianity* (ch. 2, p. 121 of vol. i.), scathingly denounced Augustine's "Fatal Axiom, . . . which impiously arrayed cruelty in the garb of Christian charity, that they were persecuted in compassion to their souls".

⁵⁵ "God holds sinners in His hands over the mouth of hell, as so many spiders. . . . He not only hates them, but holds them in the utmost contempt, and He will trample them beneath His feet with inexpressible fierceness": *Works of Edwardes*, VII., 499: quoted in *Alger's Future Punishment*, 535. Jeremy Taylor adds to a similar outburst, in his *State of Man*, ch. vi.: "Neither shall unsavoury smells be wanting. . . .

opponents of Sir James Simpson, understood Jehovah no better than Dante, and Peter Damian, and Cardinal Newman.⁵⁶ The Punic grimness of Augustinity was indeed revived in its pristine rigour by Protestant rejection of the mitigating Mariolatry of the Middle Ages : the bond between Christianity and Gothic Chivalry.⁵⁷ The saving salt of the Reformation was the revival of the old Hebrew Religion of Family-Righteousness : which had nearly been choked out of the dominant Catholic Church, constituted in A.D. 381 by the Edict of Theodosius I., immediately following the First Council of Constantinople. Ascetic Self-denial had in practice aided the foes of purity to undermine the Seventh Commandment;⁵⁸ just as it now aids the enemies of honesty in sapping the Eighth and Tenth.⁵⁹ For, the

The bodies of the damned shall cast forth a most horrible stink." Was this a reminiscence of Herakleitus? See Fr. 113, of Bywater's *Reliquiae* of H.

⁵⁶ See Newman's horrible *Sermon on Neglected Warnings* (1849). Also his *Parochial Sermons* (1842) in vols iv. (6) and v. (18).

⁵⁷ "Catholicism with . . . its worship of Isis, renamed as the Virgin Mary" : Dean Inge's introduction to *The Parting of the Roads*, p. 9. See Petrie's *Israel and Egypt*, X. : Samuel Sharpe's *Egyptian Mythology and Egyptian Christianity* : and Scott-Moncrieff's *Paganism and Christianity in Egypt*. Isis in the West : but Artemis, and Kubele in the East. For the Ephesian confluence of the Venerations of the Asian *Magna Mater*, the Ionian Artemis, and the Virgin Mary whom St. John brought with him from Calvary ; see Ramsay's *Pauline and Other Studies*, V. and VI. ; and his *Letters to the Seven Churches*, XVII., 217 ff. "The establishment of the Cult of the Virgin Mother of God at Ephesus is a critical epoch-making date in the development of Byzantine government and religion. . . . Ephesus, which had long been the champion of a purer faith, and the touchstone of error, as both John and Ignatius emphatically declare, was now made the stronghold of an Anatolian development, a recrudescence of the old religion of the Divine Mother" : *P. and O.S.*, p. 140. Compare *L.S.C.*, pp. 239-242

⁵⁸ "The tendency of such self-conscious efforts to crush the appetites is simply to concentrate attention upon them" : Dean Rashdall's *Theory of Good and Evil*, II., 71. "Asceticism is even more the offspring of impurity than the reaction from it" : Gwatkin's *Early Church History*, I., 242. Marcion, Augustine, and De Rancé (the founder of the Trappists) are conspicuous instances. Marcion even refused Baptism and Communion to any man or woman living in wedlock !

⁵⁹ "The notion, that wickedness ought somehow to be balanced by pain, seems to me wholly without foundation" : Rev. W. Temple : *The Faith and Modern Thought* (1910), p. 140. Canon Peter Green, speaking to the Manchester Police-Court Mission in July, 1912, declared himself a *Philosophical Anarchist*. "To meet sin with punishment," he said, "is not in the least in agreement with the religion we profess." And : "Our whole judicial system is clean contrary to the first elements of Christianity". These are noteworthy recent manifestos of the modern democratic "Christianity without the Commandments" : so closely allied with the Oxonian Philosophy of Collective Theft, founded by T. H.

"Progress of Democracy," or "March of Modern Civilization," is little more than a relapse from Jehovah's Family-Morality into Satan's Herd-Morality: a reversion from the ever-growing ideals of the Aryan (and Higher Semitic) patriarchal family, with its own exclusive homestead and chattels under its own Cohen or Paterfamilias; to the stagnant uniform instincts of the matrilineal Mediterranean herd of Aboriginal Communards. Over most of our globe the savages are already in the saddle; and the "Neolithic" *Nouvelles couches sociales* are stamping down the higher man to their own sordid and slimy level.

§ 21. From the time of Rousseau,⁶⁰ whose flattery of "The People" gave legs to the poisonous Divine Right of Majorities invented by the arbitrary Hobbes, Devil-worship has waned before the mushroom-growth of Man-worship; which indeed has more or less tainted every form of Christianity, ever since Antinomian Carpocratic Gnosticism was grafted on the ancient bitter root of Ebionite Envy. But there are Moloch-worshippers enough even in the Twentieth Century. The dark places of "Scientific" Curiosity are fuller than ever of the habitations of horrid cruelty. And the Anglican Episcopal Patrons of the fraud-faced "Research Defence" Society, differ from the Puritan denouncers of Chloroform in Child-birth; mainly in being man-worshippers first, and fiend-worshippers afterwards. The last learned recruit of Anglican Monks preached not long ago at Cambridge: "Christ

Green and D. G. Ritchie. See especially Green's *Political Obligation* (§ 214); and Ritchie's *Natural Rights* (V., pp. 101 ff.): "The person with rights and duties is the product of a society". Also D. G. R. on *State Interference*, in the *International Journal of Ethics*, vol. ii., p. 115 (Oct., 1891): "the Person with his Rights" is the "product of the State". Ritchie seems incapable of distinguishing Legal and Moral Rights; and Green was an even more hopeless muddler. Some of their disciples do not scruple to excuse, even thieving by individuals of the classes to which they confine their sympathies. William James has derided the "paroxysmal unintelligibilities" of Green's *Prolegomena*, in his own lucid and candid *Psychology* (I., ch. 10, p. 368). And in ch. 17 (p. 11 of vol. ii.) he complains of the difficulty of understanding: "what this strenuously feeble writer means by Relation". Compare Henry Sidgwick's search-light on *The Ethics of Green, Spencer, and Martineau*, Lecture V. Green's Oxford contemporary, the penetrating scholar Mark Pattison, has described him as a "puzzleheaded" philosopher: *Memoirs of M. P.*, ch. v., p. 167.

⁶⁰ Rousseau: *Contrat Social*, IV., 2. Hobbes: *Leviathan*, II., ch. 18, § 3. Previously suggested by Grotius, in his *De Jure Belli et Pacis*, II., ch. 5, § 17; and perhaps by Marsilius of Padua (1324), in his *Defensor Pacis*, I., ch. 17. Marsilius, however, uses the word *valentior* (*pars*), not *major*; and may be thinking of Force generally, rather than mere Number. Of all forms of "brute force," none is more brutish, none more crudely and crassly material, than the bare force of brute numbers.

summons you to a world of wonder and joy, but also of anguish and agony".⁶¹ Yet the Master, whom he professed, said to His earliest Disciples: "My yoke is easy and My burden is light". And the late Cardinal Vaughan not only flogged himself every Wednesday and Friday; but: "For years he wore on the left arm an iron bracelet, with spikes on the inside which were pressed into the flesh".⁶² What sort of God could he have been thinking of? Clearly not the God of the Prophet Hosea: who "desired lovingkindness and not sacrifice". Nor the God of the Prophet Micah; who required naught of man: "but to do justly, and to live kindly, and to walk humbly with thy God".⁶³

§ 22. Death is but a churchyard goblin.⁶⁴ Life is but a flimsy curricule; deriving all its value from the freight it carries, and becoming itself an evil whenever its freight is evil. Death is the crowning mercy of a life, whose earthly purposes have ended. Life is to be valued only as the framework of happiness and usefulness. It is "sacred"; only so far as likely to contribute materially to the harmonious de-

⁶¹ J. N. Figgis (C.R.): *The Gospel and Human Needs* (Hulsean Lectures, 1908-9), p. 153 (Appendix). The premature death (in 1919) of Lord Acton's posthumous editor, was a very great loss to students of the Middle Ages, the Revival of Learning, and the Reformation.

⁶² J. S. Cox: *Life of Cardinal Vaughan*, II., 450. The Cardinal even believed in Exorcism; according to Joseph MacCabe: *Twelve Years in a Monastery*, p. 79. Dr. Pusey in his decadence, not only used a "Discipline" (or Kitten of Nine Tails?) on himself, but prescribed it for Anglican Sisters of Mercy! See his *Manual for Confessors* (1878), p. 243. The Neo-Catholic Democrat Littledale had by that time become the real leader of the Oxford Movement: which was originally Anti-Democratic. The *Discipline* is a Punic heirloom from Pessinus, differing from the old Corybantic scourge, in having additional tails. The Phrygian Super-Paulinity known as Montanism arose at Popuza, in the homeland of Vergil's "*Berecynthia mater*"; and through Tertullian captured Carthage and Petrine Rome. The Gentile Mission had begun at Pisidian Antioch, a market-town for the rich domain of the Great Mother of Anatolia: as Sir William Ramsay tells us in his *Cities of St. Paul*, 253, 294. The Montanist Tertullian handed on the Pauline Fakir-Fancies through Cyprian to Augustine; and Harnack has even described him as the Founder of Western (Pauline) Christianity: *History of Dogma*, vol. v., 12, 16; and vol. vi., 22.

⁶³ Hosea vi. 6. Micah vi. 8. See Robertson Smith's *Prophets of Israel*, 160, 372. On p. 160, he translates Hosea's word *hesed* (A.V. Mercy), as "dutiful love" showing itself in "acts of kindness".

⁶⁴ A mask to frighten children: Epictetus: *Discourses*, II., 1. Compare Socrates in Plato's *Phaedo*, 24. "There is no passion in the mind of man so weak, but it mates and masters the fear of Death": said Bacon, in his *Essays* (II.). He said also in the same: "Death is as natural as Birth": besides being inevitable sooner or later. See likewise Metschnikoff on the Instinct of Death, in his *Nature of Man*, pp. 125 and 281.

velopment of the world,⁶⁵ in accordance with the divine purposes gradually unfolded to us by Science, and the right understanding of Scripture. And otherwise it is worthy of protection, only in so far as it is happy and harmless. Down with that impious and poisonous imposture, the Sanctity of Human Life! And let us exalt the keystone of world-wide solid blessedness, the Sanctity of Harmless Happiness in every sensitive creature! That is the Grand Transvaluation, which must prelude the Scientific Morality of the Future: and will be the next turning point in the history of Biblical Religion. Only one higher generality can we ever formulate: the Divine Purpose of Perfecting the World:⁶⁶ which is our universal standard of good, and the Chief End of everything that has life. Here is the prime postulate of the Practical Reason, which must limit every line of action! *Hic est cardo rerum; hic omnia vertuntur!*⁶⁷

⁶⁵ This was apparently the idea in Hooker's mind, when he penned his famous Rhapsody on Law: "Her seat is the bosom of God: her voice the harmony of the world": *Ecclesiastical Polity*, I., ch. 16 (18).

⁶⁶ Compare Henry Sidgwick's formula, in his *Practical Ethics*, ch. iii. (on Public Morality, in 1897), p. 63: "The well-being of the whole universe of living things".

⁶⁷ Adapted from Lactantius: *Divine Institutes*, II. (De Origine Erroris), cap. 9 (De Providentia).

IV.—PHENOMENAL SYMBOLISM IN ART.

BY P. J. HUGHESDON.

PHENOMENA may appeal to us either as significant or merely as indicative. They are merely indicative when our knowledge relating to them is empirical in character, for instance, when it is known from simple observation that if certain seeds are buried in the soil, certain plants will spring up therefrom. They must also be considered merely indicative in so far as any further knowledge we possess is ignored for the time. Significance of phenomena, depending on knowledge of the conditions or processes involved, is of one of two kinds according as phenomena are regarded as explicable or as expressive, as effects of inferred and calculated processes or as symbols of a content read in them intuitively or at least not reasoned out, consciously or unconsciously. The former is the point of view of science, the latter that of fine art and of practical insight and skill. A further notable difference is that the symbolical interpretation of phenomena is concerned very largely with qualities of life and mind of which there is immediate experience in consciousness, the causal or scientific interpretation on the other hand is concerned with truths of physics, chemistry and biology (in its lower ranges) of which there is no conscious experience. And from this it results that while in the former there are two independent lines of interpretation, the contemplative or æsthetic and the practical—thus the expressiveness of look, tone, gesture may be interpreted from the point of view either of art or of practical life—in the latter, where knowledge is mainly the result of theory-guided or of merely groping experiment, practical skill and insight are for the most part quite subordinate to theory, in other words they consist of applied science. It is true that there are, for instance, mainly practical architects and engineers, but in judging the character of the material they have to deal with they depend largely upon intuitive and symbolical interpretation quickened and developed through experience and so far their work is more nearly related to fine art than to science—this would explain the insight into constructive

problems shown so often in the history of architecture by men who were primarily artists; further, there are no corresponding sciences in the strictest sense of the term, since architecture and engineering regarded as sciences are concerned with phenomena—thrusts, resisting power of material, etc.—as calculable rather than as explicable. It is true again that the higher sciences deal with phenomena, but they do so only remotely; understanding phenomena in the strict sense, that is as meaning “manifestations to sense,” we cannot speak of, for instance, sociology as explaining social phenomena in the same way as we speak of optics as explaining phenomena of vision; in other words, we regard sociology as explaining primarily not the phenomenal facts of civilisation, but rather the underlying or implied states and qualities of consciousness (and of sub-consciousness). And it is because the matter of the higher sciences belongs to the class of facts of which we have immediate practical knowledge that there can be practical reasoning in social affairs for instance quite independent of theoretical sociology, just as there are independent practical and æsthetical arts—we might take our instance from the corresponding sphere, namely, sociological art. But here we touch upon a question considered at length in a previous paper,¹ namely, the relation between scientific and æsthetic and between speculative or contemplative and practical knowledge.

It is with the expressive or symbolical significance of phenomena that we are concerned here and we must therefore go on now to consider briefly, first, what it is that phenomena express, secondly, whether this expressiveness is essential or associative, read out of or into them, thirdly, what is the difference in this expressiveness according as it is regarded from the æsthetic or from the practical point of view.

In the writer's opinion that which phenomena express is the nature (either relatively or absolutely regarded) of reality² and they express it through the concrete ideas that they call up in the mind. These ideas are partly our own and partly they come from others. So far as such ideas are our own, phenomena are not the sole medium through which they are obtained; in addition there are states of consciousness, not interpreted as directly expressive of anything external to consciousness; these also supply the main key for the interpretation of such phenomena as are expressive of states of

¹ *MIND*, vol. xxvii., N.S., No. 105.

² In the present paper “reality” stands for the sensible world and its implications considered as realised truth, “actuality” for whatever can be regarded as actualised fact.

consciousness in others. So far as ideas come from others, they do so first through phenomena that are either in some sense imitatively expressive (as primarily in works of fine art) or functionally expressive or operative (as primarily in contrivances of practical art), secondly through reminiscent phantasms and ideas, revived, in new contents and combinations, chiefly by means of conventionally significant phenomena, verbal signs for instance. It should be observed at the same time that reminiscent phantasms may either be expressive of ideas, that is may stand to them in a causal relation, as in a piece of vivid description, or may be called up by them through association, that is may stand to them in a relation of effect. In the latter case they may facilitate the flow of thought but are not actively expressive.

Next as to the character, whether essential or associative, of phenomenal expressiveness. To the writer it seems that this expressiveness may be in great part essential and interpreted intuitively.¹ At the same time such interpretation is largely guided by each one's immediate knowledge of his own life and mind and further is progressive in character, being strengthened, enlarged and corrected through experience, internal and external. Association too is at least helpful upon the whole because most of that part of reality which a particular phenomenon habitually accompanies is that which it expresses directly or at the least something with which it is connected by intimate and essential links. Association however may be to some extent misleading and confusing; it may for instance cause a really unexpressive sound to appear full of expressiveness. Next, the degree in which phenomena (and reminiscent phantasms) are essentially expressive is very variable. Partly it depends upon the sense appealed to, being greatest in cases of sight and hearing, considerable in those of touch, pressure, and especially effort, inconsiderable with smell, also with taste, if indeed these last have any expressive power at all apart from association. Partly also it depends upon the content, varying in more or less direct ratio with the quality of the reality symbolised; thus, to take the feeling senses, tactual pressure may be very fully expressive of the quality of consciousness which prompts it, but a toothache is hardly, if at all, expressive of the condition of vital decay to which our reasoning capacity may trace it. It is possible that only phenomena symbolical of living

¹The question obviously is to a considerable extent biological. Thus any admission of the formerly highly favoured view that expression is often the incipient form of once useful action would in some cases at least exclude the theory of essential appropriateness.

content and, as the last instance suggests, not all even of those are essentially expressive.

There should further be clear recognition of the distinction between the nature of phenomenal interpretation and that of æsthetic or of practical knowledge. In such knowledge the essential thing is the truth, the reality expressed, not the expressing phenomenon, the content not the form. Hence even if the relation in the mind between form and content should in all cases be merely one of association, it would not follow in the least that the knowledge itself, that is the sense of the relation between elements in the content, was founded on association alone. The point too may be emphasised here that phenomenal expressiveness, the expressiveness for instance by which a particular quality of build or of colour indicates vigorous life or a particular glance or tone indicates displeasure is always in some sense typical, that is symbolical, rather than direct in character. By what manner of appropriateness, if the relation is really essential, the type is related to that typified and how it conveys meaning to us are problems that perhaps transcend the human power of analysis. It may however be said briefly that the correspondence is between the physiological character of the sensation and the psychical or the vital or even perhaps the merely structural character of that which the sensation expresses. It should be observed further that the use of terms like "type" and "symbol" as describing the relation of form or medium to content differs somewhat from their ordinary use as describing the relation of some one aspect or feature of reality to another.

We may now proceed to a more particular consideration of phenomenal symbolism in nature viewed æsthetically and in fine art with reference to the varieties of such symbolism and their respective significance and importance. The data with which we are concerned may be regarded either as phenomena of shape, colour, sound, etc., or more subjectively as sensations of sight, hearing, etc. In some references one aspect is more suitable, in some the other, and though unfortunately the respective lines of division do not correspond perfectly, it will be better to use a dual than a uniform mode of description.

Forms¹ or visual appearances (shapes and colours or, more decidedly, colour-tones), the most important practically and perhaps æsthetically of phenomenal manifestations, are, as

¹ The term is often used with a narrower meaning as excluding colour and often with a wider as the correlative of content. The former use, it is believed, has here been avoided.

appealing to the sight, expressive in what is living either of psychical or, as in the case of non-conscious life, of merely vital content. They are also expressive through the sight of physical (non-vital) content but to a much smaller extent and in the main only indirectly, being expressive of it as first appealing to the feeling senses, mainly to touch, pressure, strain—this qualification holds also very largely as regards vital and psychical content, since expression, attitude, movement are in part interpreted reminiscently and sympathetically and of course as a rule unconsciously as due to muscular tension or relaxation and are only indirectly referred to states of body or of mind; they are further expressive in the same way of function-content, psychophysical in living features, as, conspicuously, a hand or a claw, purely physical in many manufactured implements, as a spade or a trumpet. Sensations of touch and pressure are expressive chiefly of physical or of vital content, but also of psychical content indirectly, that is through associated muscular reminiscence, as in the passive sensation of a kiss or a handshake. Muscular sensations, when due to our own vital or psychical states, as in clenching or grasping, do not express those states to us, though they may be otherwise expressive; but muscular reminiscences wakened for instance sympathetically by another's look or voice, or movements are vitally or psychically expressive of such.¹ Vocal sounds are expressive chiefly of psychical content, their appeal being in part directly to the hearing, in part through muscular reminiscence, primarily in the vocal organs; expressive reminiscence of the kind is mainly of voice-movement (pitch, rate, etc.) and only quite subordinately of the articulation of speech. Other sounds are expressive of physical content—thus they are described as "hollow," "muffled," etc.—but mainly as that is first interpreted through touch and pressure; yet many may be vitally or psychically expressive through the medium of muscular reminiscence, as in a firm or a faltering footstep. Of musical tone as of artistic form it will be best to speak later. It should be noted that expressivenesses of different kinds may also combine in a single complex expression. Thus the human form as a whole, especially the human countenance, is, as expressive of mind and soul, probably more deeply expressive than any other natural form, but features in that form express at the same time merely the qualities of living tissue. Obviously too the actual connexion between phenomenon and content

¹ The view that all phenomenal expressiveness really consists in muscular reminiscence might perhaps be plausibly argued but could not, in the writer's opinion, be satisfactorily maintained.

is less close where the latter is higher in grade. Phenomena may also carry an indirect or secondary expressiveness, one expressive through analogy of an alien content, frequently of some quality or abstracted idea without independent phenomenal expression in nature, and upon this truth all type, metaphor, allegory, are founded. The capacity for such expressiveness would seem to be greatest, relatively at least, in the inanimate parts of nature. Thus the sunshine is suggestive of joyousness, of triumph, of luminous insight; broadbosomed hills are suggestive of enduring repose, of attained and final peace; rolling thunder appears to strike a note of wrathful warning or menace; the noise of wind and wave recalls human lamentation, and so forth; on the other hand, a view of sea or woodland in storm, while reminiscent perhaps of human fury, has also expressiveness of the primary kind, creating through the feeling senses an idea of elemental force. In addition to actual forms and sounds, natural or contrived, there are reminiscences of these, either exact or imaginative, existing only to the internal senses, pure phantasms, having a like expressiveness to that of their originals, less vivid but more plastic and symbolising often a greater depth and range of conceptual thought.

Æsthetic expressiveness, phenomenal and phantasmic, may also be considered on the basis of another distinction, that between natural and artistic expressiveness. Natural expressiveness is the expressiveness, either actually perceived or reminiscent, of natural formation or, in contrived forms, buildings for instance, of mere natural cohesion. Contrived forms, a bridge for instance, have also quasi-natural, that is functional, expressiveness; to engineers a bridge may also have a certain æsthetic interest as expressive of engineering thought, of solved engineering problems. Artistic expressiveness is either imitative or reminiscent expressiveness of phenomenon or purely of phantasm; this expressiveness usually is and, where it is purely artistic, must be in some degree selective and critical, gathering up and presenting in concentrated and quintessential condition the expressiveness of natural phenomena—regarded however as expressive of mind, the mind namely of the artist, all artistic expressiveness must be classed as natural. In art there is a considerable loss of natural poignancy, which is abundantly compensated in the interpretation and appraisal or, if one may use the term, in the mentalisation of reality. Further, art is expressive not only of the content of actuality regarded as a complex of perceived qualities but also, more explicitly than actuality, of the essential nature and the implications of that content, in

other words of the absolute character and significance of all that lies behind the phenomenal world. It should be noted at the same time as regards artistic expressiveness that only the place in art of phantasms, phenomenal or reminiscent, that is of sensible media, is now under consideration and that in the linguistic or literary arts, at least the content is not expressed in its entirety through the sensible media; the point will be referred to again later. Next, artistic expressiveness is very largely of that secondary kind noted above in which a natural form serves for the expression (metaphorical, allegorical, etc.) of an alien content. There is also another kind of secondary expressiveness in art, that in which forms or sounds suggested, for the most part unconsciously, by natural forms or sounds (chiefly vocal sounds) and analogically modelled on them are devised to express contents that are without adequate natural medium; the point, which has much importance in relation to the grouping of the arts, will be returned to later. A further difference between the æsthetics of art and of nature, arising out of the fact that art is purely æsthetic, is that we expect the one to be characterised by formal qualities met with only imperfectly and intermittently in the other. These formal qualities consist in the congruity by likeness or contrast of simultaneous or successive impressions. They have both a physiological and a psychological side or, to put it another way, they may be qualities either of phenomenal form or of content. Thus the muscular or other sensations experienced in the contemplation of a particular line or colour are a preparation for the continuation of or for certain variations from the same, and such concordant continuations or variations induce an easy and pleasant and consequently a receptive and appreciative state of mind. Similarly, as regards formal qualities of content, any given thought tends to induce a state of mind exceptionally receptive of certain thoughts, which according to circumstances are similar or contrasted thoughts, and exceptionally unreceptive of others. Formal excellence in art then, while distinct from, exists for the sake of, the essential excellence of art, to which it contributes by such a disposition of the parts as will make the most favourable total appeal to the mind's appreciative capacities. Hence too, what in itself is formally defective, harsh or abrupt for instance, may be capable of justification as subserving the æsthetic effect. Further, the relations upon which formal excellence depends are exclusively external relations of juxtaposition and succession. It should be noted

at the same time that to distinguish formal from expressive and especially from suggestively or indirectly expressive qualities is often extremely difficult. To take a definite instance, the agreeableness of the "golden section" rectangle is attributed to a just combination of unity and variety; based however on either of its narrower sides, it would certainly not present so pleasing an appearance, which seems to indicate that its strong suggestion of stability counts for something, just as the square, monotonous in form, is pleasing as figuratively suggestive of qualities of strength, rightness, trustworthiness—compare phrases like "fair and square" and so forth. In the same way various outwardly formal qualities are interpreted by Ruskin as essentially typical of Divine attributes. Frequently, it may further be remarked, this pervasive suggestiveness is as difficult to discriminate from reminiscences of natural expressiveness; as an example may be mentioned the impression of ideal quality and lofty aspiration derived from a predominance of vertical and upward lines in architecture, an impression partly due to the same suggestiveness as has given important secondary connotation to words like *upright*, *rise*, *high*, *lofty* and their contraries (this being derived from sources of very different kinds, chiefly perhaps from muscular effort in the eye and, reminiscently, in the whole frame), while partly it is due to reminiscences of plant-formation.¹

From the differences between natural and artistic expressiveness or symbolism we may go on to a consideration of the latter alone. Here we will be concerned largely with a distinction already indicated when it was stated that in addition to expressiveness founded upon a direct imitation of phenomenal symbolism there was in art expressiveness of a somewhat different kind in which forms or sounds merely suggested, for the most part unconsciously, by natural forms or sounds—the latter chiefly vocal—and analogically modelled on them are used to express contents having no adequate natural phenomenal expression. This modelling process has a twofold character, consisting in an amplification and a regularisation of characteristic features of the natural medium, which together result in a very great enrichment of expressive power. In the distinction the nature of the principal arts and their relation to one another to a great extent is rooted. Analogical imitation or, to use a more satisfactory expression,

¹ The above account of the nature of artistic form is, in the writer's revised opinion, inadequate; but it cannot now be altered.

analogical representation¹ is, in the writer's view, the essential principle of the sensible form in architecture and music and also a part-principle in painting and poetry. It will be best, however, to begin with the principle of direct representation. That sculpture and in the main painting are directly representative in medium and what it is they represent are sufficiently obvious matters. The arts of language are also directly representative, æsthetic prose as a rule entirely so, poetry in part. As regards the chief sensible medium of both, namely, expressive sound, it seems to the writer that this represents the speaking voice, that no piece of prose or poetry can be entirely effective in which the language fails to give full scope and opportunity to such a vocal movement—stresses, pauses, modulation of tone, etc.—as is most appropriate to the thought, and that in this the expressiveness, as distinct from the formal excellence, of the movement of prose and of poetry consists.² Next as regards the indirectly

¹ Perhaps no single word will express adequately the attitude of the artist to actuality. The term "imitation" is, however, generally unsatisfactory. Not only does it fail entirely as regards the creative and critical spirit in art, but it is never really the most suitable term. Thus it seems more satisfactory to say of a painter that he is representing than that he is imitating a landscape; again, in the case of a poet embodying in language his own mood, while there are elements of fitness in both the terms "representation" and "expression," to describe his work as "imitation" seems quite inapt. Indeed it is perhaps to effects of a *tour-de-force* quality that the last term applies most suitably. At the same time the function of the artist is not so much to represent as to re-present (within limits to remould) and this holds not only of fact but also of essential truth and in larger measure the higher the quality of truth dealt with. For the artist as such it is always necessary to depart less or more from the letter of reality in order the better to present its spirit; consequently the actual appears in art to a considerable extent not only as it is not out as it could not be. One of the most palpable illustrations of this is supplied by what is possibly the finest vehicle of art, the dramatic soliloquy, since men do not usually meditate aloud, still less in formed and rounded sentences or in verse.

In the present paper the term 'representation' is generally used for the relation of art to reality, 'expression' for that of form to content.

As showing how much of such expressiveness there may be even in single words the comparison may be useful of the two sentences *He is surely not there* and *He is certainly not there*. Between *sure* and *certain* there must be something like exact equivalence; but *surely* and *certainly*, the one deprecatory and apologetic, the other abrupt and overbearing in tone, are certainly far from equivalent. The difference seems traceable to differences in the vocal movement, which in the one case drags and seems to falter, in the other is brisk and unhesitating. And apart from this factor of expressive sound it seems difficult to understand how meanings are often so subtly and yet so surely differentiated. It should be observed further that if the meaning of a word is often influenced by the voice-movement in pronunciation, this voice-movement likewise is

representative arts, architecture and music, and the indirectly representative elements in painting and poetry. Architectural forms would seem to be based by suggestion and analogy mainly upon natural forms, that is upon forms of "nature" in the ordinary sense of the word; thus the resemblance, though, apart from primarily decorative features, it is never close or obvious, will reveal itself upon reflexion; good examples are the "sky-like dome" of Classical architecture and the branching and soaring pier in Gothic. In music on the other hand the analogies seem to be derived from conscious life, from the voice in essentially expressive utterance, not necessarily articulate, as in the linguistic arts, nor necessarily even human utterance. The suggestive element in the sensible forms of painting and poetry is far less broadly analogous and shows itself mainly in a certain modification of direct representation; in painting it seems to lie chiefly in tone (in the various connected meanings of the term)¹ as in the lowering of tone to gain an effect of repose; in poetry it is chiefly in the rhythm, which may be almost directly representative with very pleasing or striking effect, but as a rule is suggestively so in its most powerful appeals.²

To the difference between direct and analogical or suggestive expressiveness in the sensible forms or media of art there seems, in the writer's opinion, to be a parallel difference in the content. It is a difference rooted in the already noticed distinction in the data of knowledge (and, in spite of constant mutual qualification and interpretation, reflected in knowledge itself) between externally referred phenomena and states of consciousness. Where art-forms are directly representative

often influenced by the meaning. In either case words may be truly expressive in sound that are quite free from onomatopoeia, whether fairly direct, as in *splash*, *crash*, or indirect and analogical, as in *flash*, *dash*. (The onomatopoeic quality of English monosyllables in *ash* is a point worthy of notice.)

¹ The light that never was on sea or land,
The consecration and the poet's dream.

² Compare in the above regard the following from Shakespeare:—

(i) O that this too too solid flesh would melt,
Thaw and resolve itself into a dew!

and

(ii) Love is not love
Which alters when it alteration finds
Or bends with the remover to remove.

In the former passage the natural movement of the voice appropriate to the thought is reproduced with something approaching exactitude; in the latter it is reproduced with considerable amplification and regularisation.

of natural forms, the content primarily represents reality as revealed in phenomena, where they are analogically or suggestively so, it primarily represents states of consciousness in some measure dissociated from, if not further interpretatively and appraisingly reacting upon, such aspects of reality, that is, it primarily represents moods or tones of consciousness.¹ This view would seem to agree with the generally accepted interpretation of architecture and of music alike. In its analogical—largely unconscious—representation of natural forms architecture seeks to express not external nature but internal consciousness. Thus, to return to the examples already given, the Gothic column stands for aspiration, that spiritual aspiration which is often considered to be the pervading note in Gothic, while the dome, especially in its interior aspect, suggests the consciousness of social union in a world-wide or at least far-spreading community,² though characterisations of the kind are perhaps rather too explicit to describe generic frames of mind that may take widely varying specific forms. Music again in its content primarily represents the tone of thought, while the precise phase or feature of reality to which that tone is appropriate is generally, unless verbally indicated, a matter for individual application.³ Sculpture and prose on the other hand primarily represent reality in its concrete embodiment; both these arts show us the world, often in a new light and with fresh values assigned, yet in one sense as we see it daily ourselves, that is, their representation of it is not essentially pervaded with any sense of more being meant than meets ear or eye, any impalpable spirit of brooding reflexion, any resonant suggestion of spacious mystery imperfectly resolved and of uncaptured aspects of truth. Painting and poetry would seem to a considerable extent to combine the respectively objective and subjective points of view of the other pairs of arts, that is to represent the quality or tone of consciousness as stimulated by some particular aspect of reality and expressing itself in the context of an articulate rendering of the same. Thus the painter seeks to depict not merely portions or phases of reality but the particular appeal that these make to him, in other words his

¹ Such moods should be regarded as moods of thought, though of thought at once too vaguely general and too subtly precise for satisfactory expression in articulate language.

² Whence perhaps its frequency in metropolitan cities.

³ Thus in music the indirectness is simple, in architecture it is usually twofold; for in the latter the form is not only analogical in origin but allegorical (symbolical in the ordinary sense) in intention. A parallel contrast would seem to exist as regards the corresponding features of painting and poetry.

state of mind in contemplating them, and the latter or more subjective element he conveys primarily in tone and in colour-quality. Poetry again expresses both objective element and tone of thought, the latter primarily in the rhythm.¹ It is true that the above functions may to some extent be interchanged or exceeded, as when sounds recalling those of wings in flight, of mounting flames, of falling cataract, etc., are attempted in music. But such art will usually be limited in scale and partial in character, the expression somewhere between direct and analogical and the representation based on a corresponding compromise between objective and subjective aspects. Where an advance is made beyond this, where, for instance, music tries to reproduce natural sounds with something like exactness or to express movement directly, or where any one of the directly representative arts attempts analogical expression and the representation of mood alone in the spirit of architecture or music, the limits of sound art are probably soon overpassed. With regard further to the class of successful descriptive music based on the possibility of awakening phantasms of sight by means of phenomena of sound, it may be said that such music should perhaps be understood less as really objective than as expressive primarily of the mind's sympathetic response to such scenes and events; if there is at the same time a clear and sustained effort to represent rather than to suggest the external element as well, music is so far attempting, not necessarily with ill-success, the combined subjective and objective treatment characteristic of poetry.

It should be observed in respect of elements in the same art-form distinguished above that only in union are their potentialities completely realised. From good poetry in an unknown tongue well recited it would usually be easy to gather the general tone of consciousness represented; or, if the words, as read, were understood but the metrical principles unknown, the diction in its more palpable characteristics would obviously be quite intelligible. But most of what results from the union or fusion of rhythm with diction must

¹ Mill appears to have said that the prose-writer was "heard," the poet "overheard". Exactly how the terms were meant by him is not known to the writer; but some such distinction would seem to be involved in the distinction made above.

It may be questioned whether the style of painting known as "line-drawing" should not be classed with plastic rather than as an undeveloped form of graphic art. The connecting link might be found in low-relief sculpture, which approaches fairly close to representation on a flat surface. Such an arrangement would certainly improve the exactness of the above parallelism.

in either case be lost.¹ And the loss would usually be great. For on the one hand the moulding and quickening influence of poetic rhythm both enlarges the plastic character of appropriate language and energises such of its subtler implications, suggestions and associations, inherent or merely traditional, as are concordant with the theme, while on the other hand poetic diction brings out meanings in rhythm that apart from the clues thus provided would never be appreciated adequately.

This consideration of differences in the character of artistic forms has resulted in a grouping of the six principal or independent arts² into three pairs. The consideration of further differences will give a complementary grouping into triads, which, combined with the former grouping, will result in a symmetrical classification. This second division is the time-honoured division into arts of sight and of hearing, a division that in origin is quite naive, but where due to recognition of the sound-element in the linguistic arts as consisting primarily not in the sound of the words—this a very great extent has merely conventional significance—but in the voice-movement, it is broadly and securely based, form being the single sensible medium of architecture, sculpture and painting, sound the single sensible of music and the principle sensible medium of artistic prose and poetry. But there are other points of difference correspond-

¹ Most but not all. Apart from language there can be no such thing as rhythm, there is only the metrical pattern, which has small actual expressiveness; apart from rhythm (or its prose quasi-analogue) language is a mere medium of communication or aid to thought and memory. In the examples given, though one of the two elements is not understood, its influence in transforming metre into rhythm or language into diction is not wholly lost.

² The six independent arts, namely, architecture, sculpture, painting, music, artistic prose, poetry. Artistic prose, though invariably omitted, should surely have a place in any table of the arts. With regard to the distinction from non-artistic prose, it is important to notice that such a distinction is not really peculiar to this art. Artistic media are for the most part identical in origin and still largely so in fact with instruments whose purpose is not, as theirs is, the concrete expression of the nature of reality but simply the facilitation either of social intercourse and organisation or of mental processes, as reasoning and recalling. In the case of language this doubleness of function is fairly obvious, but it has hardly received adequate recognition. Thus the language—similarly also the illustrations—in strictly scientific writing is mainly a means of communication; consequently there is in such writing no indissoluble connexion between thought and its linguistic expression and the latter is an entirely secondary matter. The two functions however, distinct as they are, are by no means incompatible, indeed they are indissociable in the case of architecture, which is always largely instrumental and therefore can only rank as a partly independent art.

ing to and closely connected with the above. First, the artistic media of sound may be contrasted as phantasmic or as reminiscent or imagined with the artistic media of form as phenomenal or as actual. That is, in the former phenomenal actualisation is not indispensable; thus a musician can to a very great extent appreciate a piece of music from the score alone and the best musicians usually compose "in their heads". Prose and poetry again are more often read in silence than recited or delivered. But in the case of music appreciation of a composed work is certainly facilitated and amplified through actualisation, and the same thing holds perhaps of prose and poetry too, though to a much slighter extent.¹ The contrast between the entire and necessary phenomenalism of the arts of form and the partial and merely helpful phenomenalism of the arts of sound may partly be explained by the greater reminiscent power of the sense of hearing. But this superiority in reminiscent power is much increased through a further and closely connected difference of a fundamental kind, the difference namely that the parts of a work of art are distributed in the former art-group spatially, in the latter temporally.

Corresponding to these differences in the character of the sensible form or medium there is a difference in that of the content, primarily a difference as regards the relation to fact, actuality. Thus the architect seeks to represent in ideal form the characteristic and prevailing frame of mind proper to the function for which the building is designed;² the sculptor and painter reproduce forms and appearances and groupings of these, also idealising through selection, composition, emphasising of aspects. The musician, the prose-writer and the poet go rather more directly to the heart of reality, that is to essential truth, whether actualised or not; even when they compose dramatically, their most successful characters are usually in some sense the fruit of their own imaginative insight, and this holds to a yet greater extent of the actual theme, the plot, if the term is understood in its deeper sense.

The above considerations may be tabulated symmetrically as follows :—

¹ It should be observed as regards the arts of language that the essential sight-element (as to which see later in the text) does not admit of actualisation.

² The subjectivity in architecture is therefore in one sense more that of users than of designer; but the two characters may of course be combined.

	Arts of Form— medium spatial, necessarily phe- nomenal; prevail- ing method quali- fied adherence to fact (actuality).	Arts (primarily) of Sound—medium temporal, prefer- ably phenomenal; prevailing method large indepen- dence of fact.
Medium analogically expressive, re- gularised; point of view sub- jective.	Architecture.	Music.
Medium directly expressive, unre- gularised; point of view objec- tive.	Sculpture.	Prose (art.).
Medium suggestively expressive, partly regularised; point of view objective-subjective.	Painting.	Poetry. ¹

In the opinion of many to attempt a symmetrical classification is as vain in the case of art as it would be in that of science. If however what has been said above is sound a symmetrical classification does in fact follow therefrom. At the same time anything like exact symmetry is not to be looked for. The reason is that the nature and relations of the several arts depend not only upon the internal or psychological factor, but upon the external also, the available symbol-material, that is, the natural expressiveness of dead and living matter and the further expressive potentialities latent in the former—in catgut for instance. It should also be observed that the two series regarded diagrammatically are not so much parallel as convergent; thus architecture and music present a marked contrast at some points, especially in this that the one is representative almost entirely of the social, the other largely of the individual consciousness.

The above classification of the arts has no reference to their order of development. There is no doubt a certain tendency for the simpler arts to develop earlier, but a similar tendency exists also in the case of the more directly representative arts, as is evidenced in the excellent drawing of the Cave-Men—graphic art, it should be noted, at first and up to a fairly advanced stage is directly rather than suggestively representative.² There are, however, two other factors that probably have exercised a far more powerful influence in this matter. The first is fitness in the materials and instruments

¹ The common sensible feature answering to the similarity in indirect expression is obviously in the case of music and poetry the feature of 'song' or 'melody,' in the case of architecture (especially architectural interiors) and painting it would seem to be the feature of expressive spaciousness.

² See earlier note on "line-drawing".

of an æsthetic art to serve the purpose of some urgently important practical art, notably the fitness of those of architecture and of prose and poetry to serve the purpose respectively of building and of speech. The second factor is the obviousness and accessibility of materials and instruments. Here also prose and poetry have been at a great advantage, while poetry has been at an advantage as compared even with prose, since the latter is dependent not merely upon speech, but upon written speech, and even after the development of writing is more hampered than poetry through the cumbersome of early scripts and even through the scarcity of suitable writing instruments. It is obvious too that as regards this factor music has been the least fortunately circumstanced of the arts, which may be the principal cause of its late development. At the same time advantage at the above points has perhaps been by no means an unmixed benefit. Thus the development of language primarily as an instrument of daily usefulness or rather necessity means that language has been formed primarily for an unæsthetic purpose (dependent in part, it is true, upon semi-æsthetic means) and has only been adapted as best might be to purely æsthetic uses; its imaginative quality has probably suffered in consequence; compare in this regard words restricted to æsthetic uses, as *sere*, *billow*, *steed*, *sable*, *robe*, with their more handy but less suggestive, less mentally resonant synonyms.

It may further be remarked that where practical motives become paramount and the æsthetic side of the arts sinks into mere subservience thereto, other features appear bearing no relation to the system set forth above. Thus popular music in its practical character as entertaining or inspiring is both eminently social and at times druglike in influence, operating now as a sedative, now, in martial music for instance, as a stimulant. These characteristics are naturally prominent in early music before the art has developed sufficiently to assert its æsthetic independence and they are the characteristics especially noted by Plato and Aristotle, who had only the rudimentary Greek music before them. Hence to commend as implying exceptional discernment the importance attached by those writers, on the ground of such characteristics, to the educational potentialities of music—the point was perhaps impressed on them by the cultural and disciplinary use of music in Greece, notably at Sparta—seems to indicate a misunderstanding of their true position.

We may now go on to consider more thoroughly the part that the several sensible media play in relation to the several arts. It has already been insisted upon sufficiently that the

arts of form appeal mainly to the phenomenal vision, while the arts of sound appeal primarily to the hearing, music at least preferably to the phenomenal hearing. Prose and poetry appeal to the hearing in unregularised and in regularised voice-movement and intonation, also—poetry chiefly—in non-imitative description of sound, also in rhyme, alliteration, expressive quality of word-tone, etc., and occasionally through more or less imitative representation, direct or suggestive of non-vocal sound,¹ and they also appeal to the vision; to the hearing they appeal ordinarily, that is in silent reading, as reminiscent not as phenomenal and to the vision necessarily so, in which connexion it should be observed that in the acted drama it is the sound-element rather than the form-element that is realised phenomenally, the spectacular part of acting being concerned with what in the purely artistic drama, as distinct from the mere stage-play, are only accessories. Another point worthy of notice here regarding the arts of language is that the rhythmic sound-element is always present, the visualisation and other sense-elements on the other hand are quite intermittent; thus, while it is true that all use of language is attended with visualisation of the weaker, associative kind, yet such visualisation has at the most merely negative æsthetic quality, that is, it should not suggest decidedly un-æsthetic images. In music too there is, of course, much imaginative or reminiscent visualising, but, while æsthetic in quality, it is perhaps chiefly secondary, suggested by rather than suggesting the frame of mind expressed, and so varies as widely as the individual interpretation. To the feeling senses the stronger appeal is made by the arts of form, but the appeal is to these senses almost wholly as reminiscent not as phenomenally affected. Thus there is present in the arts of form, especially in sculpture, the reminiscent “feel” (softness, weight, etc.) of the actual (in architecture) or the represented matter; it is also present occasionally and more faintly in the arts of sound. Important in the arts of form are the spatial muscular sensations (in eye and body), mainly as reminiscent, but in architecture largely actual. Sensations of effort and resistance are also awakened reminiscently in the arts of form, which are pervaded, either actually (in the case

¹ As in the second of these two lines of Tennyson:—

The moan of doves in immemorial elms
And murmuring of innumerable bees

where the representation is unusually direct. Imitative and non-imitative description of sound are strikingly combined in the same writer's lyric *The Splendour Falls*. Expressive quality of word-tone may be illustrated by the prevailing character of the terminal syllables in Milton's sonnet *On the Late Massacre in Piedmont*.

of architecture) or representatively, by the manifestation of the result or the operation of muscular activity or of natural forces.¹ Such sensations again are obviously recalled in the arts of sound, so far as these are based upon expressive voice-movement; as involved in the articulation of language, they are also utilised in the same arts; an instance is the reminiscent laborious energising of the vocal muscles, communicated thence to the locomotor muscles, resulting from the line of Pope

That like a wounded snake drags its slow length along,

or the quickening, but only partly muscular, effect of Browning's verses, *How They Brought the Good News*. Reminiscent muscular effort again, for instance the reminiscent climbing associated with architectural features like the Gothic tower² and column, is, as suggestively and figuratively interpreted, especially important both in architecture and in music. Lastly there is for expert artists the reminiscent feel of the material and tool in operation, as of marble and chisel, sensations of the kind being experienced in perhaps all the arts, as regards either creation or rendering.

A further important point is the relation in which in the respective arts the sensible medium stands to the conceptual content. In the first place, the part played by the medium appears to be one of relatively declining importance as we ascend in the scale of the arts; to put it another way, there is progressive immaterialisation. Such a tendency is obvious, as regards arts belonging to the same series, in the matter of bulk or volume. There is decline in the extent also to which either actuality or intensity is necessary or helpful. Thus in architecture actual substance and actual content are necessary; stonework for instance may waken reminiscences of tree-formation but it must also be expressive of its own nature and characteristic architectural qualities; a building again must both serve its purpose and express not only its purpose in a general way but also the design and structure belonging to it as building. In sculpture there is complete adoption of an alien form and effacement of all positive expression, but without positive disowning, of natural content.

¹ Reminiscences of a privative kind, namely, those arising from the representation of qualities like limpness and powerlessness, should also not be overlooked.

² Watching with upward eye the tall tower grow
And mount, at every step with living wiles
Instinct—to rouse the heart and lead the will
By a bright ladder to the world above.

—WORDSWORTH.

In painting actual solidity disappears and there remains mere superficial extension. In music there is still entire dependence on the symbol, but this, though preferably phenomenal, is not always necessarily so; the external factor too has neither extension nor continuous existence. In the arts of language the symbol is always in part at least purely phantasmic; further, as regards strictly essential elements, it can become phenomenal only in respect of sound, and even this degree of actuality is exceptional and unnecessary. To compare further the two arts, prose seems to gain more in being read aloud than does poetry, because the movement in the former has less suggestive quality and is closer to the natural movement in speech. The prose drama again probably gains more in being put on the stage; indeed, were it not for the fact that dramatists have been obliged by circumstances to keep theatrical and spectacular considerations constantly in mind, the best poetic dramas would perhaps lose more than they gain in being put on the stage; for against the increase in intensity and in realistic interpretation must be placed the obliteration of the ideal setting, the undue prominence of accessories, the obscuring of rhythmic expression where this does not coincide with a directly representative voice-movement and intonation, finally, though this of course is not inevitable, deliberate alteration for melodramatic effect, as when the closing passage of *Hamlet* is suppressed in favour of a sensational 'curtain'. There remains another very important point in connexion with the relation of æsthetic concept to symbol or sensible medium, namely, that in the case of the arts of language and only in their case the concept in its æsthetic appeal is partly independent of such medium, for the voice-movement, the single sensible element that is always present, and the other, intermittent sensible elements only supplement and amplify the meaning of the words. Yet this differentiation is perhaps rather too absolute, since the æsthetic concepts embodied in any work of art would appear to contain non-sensible elements of knowledge and reflexion not expressed but merely recalled by the sensible medium. Even then it might be objected that in the other arts the sensibly expressed element must be prior to the purely conceptual; but this perhaps is not necessarily so in the mind of the artist; or the same element may sometimes be prior in the arts of language too—thus in many short pieces and passages it may really be that the rhythmic inspiration due to the tone of mind suggests the linguistic character. In music too of course words are generally used, but, according to a widely held opinion, the medium in its perfect form

is wordless; further, where words are used, their part is mostly quite secondary, that is, they are not to any great extent directly expressive, but serve rather as clues to the expressiveness of the music; hence composer and librettist may be and usually are different persons, perhaps of very unequal artistic capacity.¹

With the features, to one regarding the arts in serial order, of declining sensible intensity and less materialised representation is connected perhaps in part the correspondingly increasing tendency to deal with themes of unrest, sorrow and evil in all its forms. Thus in architecture such themes would seem to have no place at all, unless it be held that a prison for instance should be more than mere building and should have expressively gloomy and forbidding features. In sculpture again, as tested by the practice of the best period, themes at least mentally reposeful are greatly preferred, and to a lessening extent the same is still true of painting in its rendering whether of nature or of man, though here even scenes of calm and peace are sometimes touched with a more sombre note as of "pastoral melancholy" or "the still, sad music of humanity". When we come to music there is an appreciable rise in the proportion of attention given to pain and distress, and in the arts of language this is yet more the case and the subject of moral evil now comes definitely to the front, though the outlook upon life of the greater poets is upon the whole one of qualified optimism. To the writer it seems that one cause of this tendency is the fact that since all actual pain and evil are distressing, the further an art-medium is from actuality the more capable is it of representing pain and evil in ways that do not distress so much as to interfere with æsthetic appreciation. This account obviously fails to meet the case of the drama, where themes of the kind are frequently handled with a near approach to and indeed a semblance of actuality. A further explanation may however be found in the distinction already noted between the spatial character of the earlier and the temporal character of the later art-group, since arts of the former group are unable to compensate for showing evil temporarily ascendant by showing it ultimately vanquished or surmounted except by means of a serial presentation of the theme in its successive phases, a device that has not been used very much by artists. There is indeed one sense in which the arts nearest to actuality are in the one group sculpture (with the kindred forms of plastic art, also

¹ If the perfect form of music is wordless, this would seem to imply or at least to suggest that the perfect form of architecture, all except artistic considerations excluded, is independent of sculpture and painting.

undeveloped or imperfect forms of graphic art) and in the other group prose; for these arts are the most directly representative and are able to reproduce the most literally. Hence these are the arts best suited, at a certain loss of their purely artistic character, to serve the, as a rule, only imperfectly artistic function of the effective commemoration or communication of fact.¹

¹ After what has been said as to the meaning of verse-rhythm, a few words may be permitted with reference to that sound-element which in modern stressed verse is its usual complement, namely rhyme. The function of rhyme would seem to be in the first place to carry the chief, namely the terminal, stress in a verse; otherwise this recurrent pause would tend, in most metres depending primarily upon stress, to give an unpleasantly jolting and halting character to the movement. The disadvantage can however be surmounted in other ways, especially as, in the case of blank verse, through the employment of the periodic sentence, where the terminal verse pause is necessarily less emphatic. Secondly, rhyme helps to idealise the utterance and to remove it from commonplace speech and so facilitates a boldly and freely plastic and suggestive use alike of rhythm and of language. It is true also that the necessity of rhyming suggests ideas. Such apparent helpfulness is however something of a snare, since there may easily be an overreadiness to accept suggestions of the kind as solving the rhyme-problem when a little more thought might give better results.

In English however rhyme is not a matter of sound only, sight-rhymes or spelling rhymes being also admitted on a considerable scale. For this the paucity of English sound-rhymes cannot in itself be held a sufficient defence. What really justifies a limited recourse to spelling-rhymes is the fact that writing, while not an essential part of the sensible medium in verse, is nowadays an indispensable accessory, indeed with really good visualisers the written symbol is never totally suppressed; consequently the effect of this symbol upon the mind must be taken into account. Whence of course it follows that, other things equal, the rhyming is to be preferred for instance of *feat* and *heat* to that of *feat* and *sleet*; but other things never are equal.

V.—DISCUSSIONS.

MR. BOSANQUET ON CROCE'S ÆSTHETIC.¹

CROCE'S Æsthetic is of interest from two standpoints, closely related but really distinct. It is a theory of Art and therefore has to take into account all the problems of artistic production,—the problems of the artist, who has to choose his material and elaborate special methods, and the problems of the æsthetician, who seeks to discover the rules and standards of artistic appreciation. It is also a theory of Beauty, and Beauty is a pure concept like Truth and Goodness. As such it is a problem of philosophy and cannot be dissociated from the general principle of the philosophy of which it forms an organic part. In Croce's view, as Dr. Bosanquet begins by pointing out, "Art and Beauty are one and the same thing, and that thing is an experience of the human spirit". But in criticising this view we have to be careful to keep our criticism on the same plane and preserve an identical standpoint, otherwise we shall find ourselves in danger of alternately resolving the special problems, which have meaning only within very restricted and entirely practical spheres, by appeal to broad generalisations and then condemning the philosophical principles by arguments drawn from the limited perspective of the individual artist. It would be as though we should suppose ourselves to be advancing the science of chemistry and helping the chemist by insisting on his recognising the fact that, when stated in terms of atoms and molecules, salts and acids have no qualitative differences. In like manner we may press the philosophical identity of theory of art and theory of beauty into the denial of any qualitative difference between say painting and poetry, and then to painter and poet we shall seem to be preaching that all art is vanity.

It seems to me that Dr. Bosanquet in criticising Croce's Æsthetic is not free from reproach in this respect. Let me hasten to add, however, that this does not imply that there is, even unwittingly or unintentionally, any unfairness in his criticism. If Croce's Æsthetic strongly attracts me, and equally strongly repels Dr. Bosanquet, I have to try to discover the reason, and it does not seem difficult. Some years before the world had heard of Croce and his theory, Dr. Bosanquet wrote a *History of Æsthetic*

¹ *Proceedings of the British Academy*, vol. ix. (10th December, 1919).

which is classical. It was a pure artistic interest, that is, an interest in the great works of art, in the methods and technique of art production and also in the part which æsthetic appreciation of works of art plays in the mental life, which attracted him to the æsthetic problem. And in this he was following the high tradition of the great art critics, Ruskin in particular. But Dr. Bosanquet is also one of the leaders of the intellectualist school in logical theory and metaphysics. It is easy to see therefore how difficult it must be for him to judge æsthetic theory without the intrusion of the artist's individualist standpoint, and without the special problem of art production being of the very essence of the theory. My interest in æsthetic is quite different. I have always been interested in art criticism. One of my cherished recollections is discussing Ruskin's theories with Dr. Bosanquet in the Giotto chapel at Santa Croce in Florence (when we were both much younger), and I read the *History of Æsthetic* when it appeared in 1892. Yet until I read Croce I never felt that Æsthetic theory was an essential and necessary part of philosophy. My first introduction to it was the Heidelberg Address in 1908, but it was not till some year or two later that I read the *Estetica*. It then suddenly burst upon me that at last I had found a doctrine which made a whole philosophy consistent. For me therefore it is by his philosophical doctrine that Croce must be judged, and by the consistency of its æsthetic theory that it must stand or fall. What then is the philosophical doctrine?

Dr. Bosanquet has given in his essay an admirably concise account of Croce's general theory. He has also, it seems to me, given a very just estimate of the nature of the influence of Vico's theory in the suggestion of it. The criticism however at times puzzles me and sometimes too, I must confess, appears so obviously surface criticism as to make me wonder. In the main, however, and particularly in the Appendix, it is penetrating and effective. I will give an illustration of what I mean by surface criticism,—criticism which does not penetrate to the author's meaning. On page 8 there is a paragraph exposing what is called "a nest of contradictions". Here is one of the contradictions. "Intuitions, we are told, are things, concepts are universals or relations. Things! We can have intuitions of things, then, without concepts or categories, without the *de facto* working in our minds of the thoughts of identity, distinction, substance, whole and part." But, I ask in amazement, is it the same thing to say "intuitions are things" (meaning as I understand the phrase that intuitions are the terms which the concepts relate) and saying "we can have intuitions of things" (which to me is the direct contradictory). If you make this transformation you have indeed a complete absurdity.

I cite this particular criticism because it is just on this point that Croce's theory appears to me so illuminating. Croce denies or rejects the reality of the external world. So too do many other

idealist philosophers. I had always thought that Dr. Bosanquet himself did, and unless Hegel also did I have signally failed to understand "absolute idealism". Now the one thing which has always seemed to me to offer the insurmountable difficulty to absolute idealism is the impossibility of constructing the world out of concepts. Concepts are universals or relations: how do universals become concrete, what do relations relate? Croce is the first philosopher who has given a plain unambiguous answer to these questions, and this to me is the supreme value of his æsthetic theory. Reality is the life of the mind; it is spirit, activity, essentially present and all-inclusive. No ghost of a thing-in-itself haunts it; no otherness confronts it with a dual claim to be recognised as real. Of course this is no new idea, but how have philosophers hitherto attempted to rationalise it? By positing a mental construction of sensations, sense-data, sensibilia, —or by whatever other term they have tried to distinguish and denote the elementary constituents of experience,—concepts and categories being the cement. Croce points out that this can give no result, for the simple reason that it leaves out the first initial grade of the activity, the first step in its expression,—the creative work of the imagination. There is no knowledge in pure sensation, just as there is no perception of the pin in the pure pain of the pin-prick. Mental activity begins with the expression of the intuition in the creation of the image. This is the condition and pre-supposition of all mental life. Until the image is created there can be no perception, no intercourse, no purposive action. To perceive the sun is not to remember that I had a warmth-sensation associated with a light-sensation yesterday similar to those I experience to-day. I cannot connect my sensations with the sun, or in any way perceive the sun, unless I have formed the image. Sensations may provoke an involuntary response in reflex action, but they cannot lead to purposive action, they cannot make the voluntary muscles function, unless I create for them an image. I cannot have intercourse with another mind unless my own mind, having expressed itself in an image, can by purposive action arouse in another mind the activity of imagination. This fundamental creative activity, this first step in the mental life Croce describes as intuition-expression. It gives mind its world.

If this theory be true it seems to me impossible to exaggerate its importance. It marks a definite stage and advance in the evolution of philosophy. Looking back over the history of modern philosophy we see how continually it has been missed. The Cartesians rejected sense altogether. It belonged they said to the realm of confused and obscure ideas. It had for them a purely practical utilitarian purpose. It was an endowment meant to preserve the body from destruction, not to lead the mind to truth. The empiricists were hypnotised by the notion of a sense manifold out of which, by some marvellous magic of external association, an ordered world admitting of scientific prediction arose. The

critical realists to-day are exercised about the relation of "objectives" to "objects". The absolutists take the logical criterion of consistency as the affirmation of reality and construct therewith a transcendent individuality. The charge against all these aspects, systems, methods, which Croce urges is that in them dualism is never successfully overcome. External reality either stands over against spirit in splendid isolation and its relation to it baffles all attempts at comprehension, or else it hovers round the idealist construction like a ghost, refusing to be exorcised however illogical its claim to exist.

For Croce on the other hand, the external world is constituted by spirit in the first degree of its activity and as the initial stage. There is no knowledge until the mind finds the expression of its intuitions in the creation of images. This precedes sense perception for the simple reason that you cannot perceive anything until there is something to perceive. Perception is therefore a later stage in the activity, that in which the judgment of reality or unreality is brought to bear on the created images. This is why Croce identifies the creative imagination with the artistic activity, and so places art, and not philosophy, as the first degree, that on which all evolution of spiritual activity depends. So, following Vico, he declares poetry not prose to be the primitive form in which men found the possibility of intercourse by speech. And the essential nature of this creative imagination or artistic faculty is that it is lyrical. It works from within outwards and not *vice versa*, expresses in song what the heart yearns for.

It is this identification of the primitive, simple and universal æsthetic activity with art that Dr. Bosanquet criticises, and the main brunt of the criticism falls on the essential feature of the theory,—what for Croce has evidently been the motive of it—the overcoming of dualism. Dr. Bosanquet seems, even vehemently, so far as the recognised work of art is concerned, to re-affirm dualism. When "Hamlet" had found expression in Shakespeare's mind, so I understand Dr. Bosanquet to argue, there was as yet no work of art. Something else and that quite alien in its reality to Shakespeare's mental activity was required, the material, in this case literary form. To which it seems to me Croce's reply would be to ask what would remain of this material, what beauty of expression would abide were our race to become as extinct as Neanderthal man, were there no mind whose imagination could respond in creation to Shakespeare's vision? And yet one sees easily enough the artist's difficulty and sympathises with the appeal which a friendly critic (Mr. Walkley) has addressed to Croce to make his theory of the relation of the material to the work of art clearer. But this it seems to me is of quite subordinate interest to the philosopher, and what I should like to know and cannot find clearly indicated, is the extent to which Dr. Bosanquet's own æsthetic theory commits him to ultimate philosophical dualism.

In an Appendix, Dr. Bosanquet deals with Croce's criticism of Hegel and particularly with a phrase he employs in regard to Hegel's Æsthetic, "the death of art". Dr. Bosanquet declares it to be a mistranslation of Hegel's word *Auflösung* which means dissolution, and he argues that the word "death" gives a totally wrong interpretation of the real meaning. He shows, very effectively, that for Hegel, as for Croce, art is a degree of the absolute spirit and whatever be the place of that degree its nature is not in question. Moreover any such condemnation as is implied in the word "death" would apply equally to Croce's own theory.

Finally, then, it seems to me that Croce by his æsthetic doctrine has given a concreteness to the concept of actuality as spiritual activity such as no philosopher before him has succeeded in giving. I use the word "actuality" purposely,—"reality" may have a transcendental meaning which "actuality" cannot have. The theory may seem to dethrone art; but when the philosophical principle is grasped it is seen that in humbling art it is exalting it.

H. WILDON CARR.

CROCE'S ÆSTHETIC.

PROF. CARR kindly invites me to send along with his account of my paper any reply that I may wish to make.

It appears to me that the difficulties which he feels in my view partly arise from my not having made a clean breast of my attitude towards Croce, and having confined myself to points which I thought outstanding examples of our differences. If I may, I will shortly restate the general position as I see it, in order to show just why and how far I attach importance to certain points.

1. I cannot accept the warning of Prof. Carr's first paragraph. If you identify Art and Beauty, you cannot separate the philosophical theory of Beauty from the investigation of its concrete differences, which you have pledged yourself to find in Art. And Croce certainly identifies Art and Beauty, and in fact frequently and carefully discusses the nature of the expressive utterance and vision which he equates with both. The æsthetic philosopher has nothing to do with rules of artistic appreciation, but he has to do with the differences in the spirit of man which utter themselves under varying conditions of expression.

2. Prof. Carr courteously refers to my *History of Æsthetic*. But its argument, to my mind, was other than he thinks. It was a philosophical argument, and aimed, in a word, at establishing the view that the post-Kantian absolute idealism sprang from the work done in æsthetic philosophy by many great men, confronted with Kant's antitheses, during the closing decade of the eighteenth century. This was simply Hegel's narrative of the facts. I took, and I still take it, to be obvious and true. I held myself to be merely dotting the i's and crossing the t's of a simple insight. All the book led up to it, except that part which completed the subsequent construction. It was a philosophical argument and conclusion. I said of the dominance of the Absolute standpoint, which I thus had traced to its climax, "Inner and outer, natural and supernatural, spiritual and material, are henceforward terms that have lost their meaning, except in reference to the higher and lower purposes of man".¹

3. Therefore when Croce declares against transcendence, and in favour of the pure unity of beauty as an intuition-expression, one with the experience which is art, that is saying brilliantly what all students, I should think, agree with. But in labouring to intensify

¹ *History of Æsthetic*, p. 322.

to the utmost the singleness and purity of the experience, he entangles himself—such, I regret to say, is my real and inmost belief—in a fundamental error which takes two connected shapes, and affects his whole philosophy.

(i) The doctrine of the four phases of the spirit, Art, Logic,¹ Economic, Ethic, if not *determined by* the identification of the purity and singleness of æsthetic expression with priority to the operation of thought, coincides felicitously with it. And this priority, though not treated throughout in detail as temporal priority, is yet stamped as in principle an actual and exclusive antecedence by the identification of æsthetic and linguistic experience, which is Croce's special pride and delight and for the sake of which he destroys and removes one aspect, the logical aspect, of the latter. In fact, on whatever ground selected, the four phases of the spirit build up no whole, have no inherent dialectic, and are quite untenably and superficially distinguished.

I will at last take my courage in both hands and say that in my belief, if Croce had never heard of Vico, and had not been attracted to him by a love of paradox and by patriotism, his philosophy might have been impregnable and his art-theory profound. I believe it is the hoary fallacy of looking to the primitive for the pure and original, that, favoured by a chivalrous enthusiasm for a neglected fellow-countryman, has wrenched Croce's whole system out of gear. It may be true of literature that poetry is earlier than developed prose. But this "Ancient Opinion" insisted on by Vico as by our own Blackwell early in the eighteenth century, cannot conceivably justify a theory which destroys the essence of articulate speech in order to equate it with pre-conceptual intuition-expression.

And, since I may as well be hung for a sheep as for a lamb, I must add that I have sometimes doubted whether Croce's learning is entirely critical and reliable. He has read immensely, and uses his knowledge most effectively; but where he has come within the narrow range of my studies, over less than a thousandth part of his enormous field, I have found negligences and exaggerations that have shocked me as a scholar, notably in the accounts of Lessing and Schelling; and in the case of Hegel he seems to me, as Prof. Carr has mentioned, to have fallen victim to a grave misconception, which only impulsiveness and an unsound philosophical basis can account for.

(ii) The phases of the spirit, then, thus arbitrarily selected, have no room for externality. They allow, in fact, of no whole, no world, no universe. They have no inherent dialectic (I think that I see in the *Breviario* some advance in this respect, and with a change in it, much would be altered), no integration of differences; simply an arbitrary succession. External nature is for Croce only the physicist's abstraction. The glowing and splendid world in which for most of us it consists is ruled out of his theory, because,

¹ The system has no place for philosophy as such.

in that theory, a concrete existence of the spirit is inconceivable. And this he calls getting rid of dualism and transcendence! I am aware of his doctrine of history, but I do not consider it adequate. Now these are the reasons for my insisting on the objections which to Prof. Carr and others seem captiously taken.

The position of art and beauty among the forms of the spirit is, I believe, a flat self-contradiction. They are essentially prior to conceptual thought; that is the main point of the whole arrangement. But this is really impossible. There is no such prior stage. The image may be free from any explicit judgment; but to call it an image means that it is discriminated by thought and referred to objective conditions. How else could it be an image of anything? The intuition is thus at once pre-thought and an object of thought. Prof. Carr doubts my interpretation; but Croce's examples leave no doubt, "The intuitions are this river, this lake, etc." How can this river be other than an object of thought having identity, diversity, and all the rest? But in addition to this we have on our hands Croce's favourite doctrine; the equation of æsthetic and linguistic expression. Language as levelled with pure expression, is deprived, by Croce, of its conceptual side. But language without conceptual analysis is not human articulate speech. It could not communicate information. Undoubtedly, language possesses the continuous and poetic side which Croce ascribes to it, but as an aspect, not as a phase, an aspect out of which a transformation may grow. The æsthetic attitude is *learned*, as Schiller explains. It is an acquisition, an interest transcending the actual and practical real, not an endowment primitive and prior to this latter interest. "Man is not civilised till he learns to value the semblance above the reality."

So with externalisation. The fusion of spirit and body is the æsthetic experience, and is a principal type of the unity of the world. That Croce has no theory of body as a category of spirit is just a case of the leanness of his idealism, which also is unable to include metaphysic or religion.

And the odd thing is that no one has more eloquently recognised the *actual* need for externality. Wherever he is arguing that nothing is art or beauty which is not expressed, he actually uses externalisation as the very test of expression. So with Prof. Carr's instance of Hamlet. Of course if all imagination were dead and gone Hamlet would be dead and gone too. No one says there is beauty without imagination; what we say is that complete imagination demands externality. The point is that Hamlet as a poem in Shakespeare's imagination is already a fusion and incarnation of Shakespeare's spirit in features of the external world, forms of verse, forms of language; "ringing words," as Croce well says. A Hamlet which is less than this is not Hamlet.¹ A Hamlet which is as much as this has sprung from an

¹ See notably Prof. A. C. Bradley on "Poetry for Poetry's Sake". Oxford Lectures on Poetry.

imagination wedded to the spoken language of England, schooled and inspired by its energy and sonorousness. A poem without its sound, I must maintain, is incomplete as a work of imagination. Shakespeare was taught and disciplined by the spirit which lived in England and in English speech. Without this externality there could be no Hamlet. The miracle is the incarnation of the spirit in the fact and the penetration of each by the other. This is the type of unity which the spirit follows at different levels. There can be no unity where nothing is unified, and no profound unity where the factors unified are not strongly opposed. To say that externalisation, as a category of the spirit, involves a dualism, is to say that it is a dualism when the musician's work is interpreted by the full orchestra. Surely this is the very type of spiritual synthesis, and the triumph of unity. To treat this performance as a practical means (economic)¹ for ensuring the preservation and communication of an imagined beauty separate from it, and complete without it, is surely the very feeble expedient of a philosophy, which finds itself trying to put asunder what the universe has joined together.

¹ See Croce on the four stages of æsthetic production, *Estetica*, 112 ff., and chap. vi., *ibid.*

BERNARD BOSANQUET.

VI.—CRITICAL NOTICES.

The Principles of Natural Knowledge. By A. N. WHITEHEAD, Sc.D., F.R.S. Cambridge University Press. Pp. xii, 200.

THIS book of Prof. Whitehead's seems to me to be very important and distinctly difficult. These facts must be the excuse for the length and the almost wholly expository character of the present review. My main object is, not so much to criticise, as to render what Mr. Bernard Shaw, in the preface to one of his plays, calls 'first aid to critics'. It is a misfortune that the same book should fall twice into the hands of the same reviewer, as has happened in this case. It would be far better to have had the views of two different writers. I can only condole with Prof. Whitehead on his luck, assure him that it was not altogether my fault, and do my best to avoid simply covering the same ground twice over. In a book so rich in matter as this the last task is easier than it would be in many instances.

The book starts with a criticism of the classical concepts of mathematical physics; points, instants, momentary states, unextended particles, etc. It is not denied that such concepts are useful and even indispensable, but the question is: What is their real status? The ordinary physicist rejects such questions as almost indelicate, but for the philosophy of nature it is essential to give some answer to them. The plain straightforward answer is to say that they are particular existents, just as much as anything that we can perceive, and that they are the ultimate constituents of nature. Very few physicists have had the courage to say this and stick to it; the best statement of such a view, so far as I know, is to be found in the last few chapters of Mr. Russell's *Principles of Mathematics*. Even here, however, there is a certain amount of wavering about material, though not about space and time as such. It is insisted that the laws of motion must be expressed in an integrated form as regards time, because a differential coefficient is a mere limit; though for some reason the fact that a density is also a differential coefficient is not seen to lead to the same consequences as regards space and matter. In any case Mr. Russell has long ago deserted this view; and the position of the average physicist seems to be (a) that he either says nothing on this delicate subject, or professes himself to believe that the ultimate constituents of nature are extended and that space and time are relative, and (b) that, having done this, he always acts as

if he believed the opposite. Lastly, when asked what he supposes to be the relation of the sounds and colours which he does perceive to the atoms and molecules which he does not and to the points and instants which are still less like anything perceptible, he either replies that this is 'philosophy' or talks nonsense about sounds and colours being 'unreal'. The idealist philosopher then fastens on these incoherences; informs his readers that physicists move in a world of 'partial appearance' and 'relative truth,' which is quite good enough for persons of their crude understandings; and proceeds to discuss those questions as to whether the Absolute is (or is not) good or happy or a person, which are of such burning interest to minds of finer fibre.

Now the great merit of Whitehead's book I take to be this. He criticises the classical concepts, when taken to be the ultimate existents in nature, as severely as any idealist, though from a far more adequate knowledge and with much less *arrière pensée*. But he also knows that physics cannot get on without them, and believes that the final results of physics are true and verifiable of a large department of nature to a degree to which no philosophical theory can lay the least claim. His problem therefore is this: To define entities which (a) shall have the same formal properties and thus do the same mathematical work as the points, instants, etc.; and (b) which shall be so connected with the objects that we do perceive and with their perceptible relations that their reality in their own type is as certain as that of the perceptible entities and their relations in *their* type. If he can do this he has killed two birds with one stone. In the first place such entities will no longer be, at best, precarious inferences from what we do perceive (as are atoms or molecules on the usual view), or, at worst, entities which neither resemble what we perceive nor can be inferred from it as hypothetical causes (like points and instants on the absolute theory). They will be instead certain logical functions of what we perceive, defined wholly in terms of it and its relations and of logical constants. Secondly, these entities will now escape the criticisms to which they are exposed when they are regarded as particular existents and the real ultimate existential components of nature. For they now cease to make any such claims, since they are no longer of the type of particular existents but of logically higher types such as classes or classes of classes. They had formerly occupied an embarrassing position in the lowest seat at the feast of nature, and Prof. Whitehead has saved the situation by saying to them: 'Friend, go up higher' (in logical type)!

The object of the book then is to start with the genuine elements of nature which we meet in perception, and their relations; and to exhibit the concepts of physics—modified in accordance with Einstein's first theory of relativity—and *their* relations, as definite logical functions of the former. Thus the work falls into two parts: (i) the determination of the natural elements, and (ii) the detailed exhibition of the concepts as functions of them. In actual

fact Prof. Whitehead has accompanied (i) with a general verbal account of (ii), so that it is possible to understand the main drift of the book without reading the detailed logico-mathematical part of it. But a very great part of the value of such a work consists in the detailed proof that the concepts can be connected with the elements, by actually showing the connexion. Other philosophers could have suggested vaguely that the concepts must be some kind of logical function of the elements, but scarcely any except Prof. Whitehead could have worked out the suggestion to a successful conclusion in minute detail. I shall therefore first sketch Prof. Whitehead's view of the elements of nature, and then try to explain the logico-mathematical part of the book.

Nature consists of two fundamentally different but intimately connected types of entity, events and objects. Events are pure particulars, objects are universals. The fundamental connexion between the two is that events are the situations of objects, *i.e.*, an event is characterised by being such and such an object. Events therefore cannot recur in time or space, but objects can, in the sense that different events can be the situations of the same object. Objects are not strictly in space and time and consequently do not strictly have parts. The events which are their situations are in space and time and have parts which are other events. Thus the *event* characterised as 'being a leg of such and such a chair' is a part of the event characterised as 'being such and such a chair'; but the *object* 'being a leg of such and such a chair' is not in the physical sense a part of the object 'being such and such a chair'. It is easy to confuse objects with their situations and thus to imagine that they are in space and have parts.

Events are extended both in space and time. (An event has no special reference to change.) They fall into two great classes, those which are and those which are not durations. An example of a duration is the whole course of nature contemporary with any specious present of any percipient. It is thus limited in time and unlimited in spatial extension. The particular length of anyone's specious present is irrelevant; there are durations of all degrees of temporal extension; the important point is that all have infinite spatial extension and none have no temporal extension. Events other than durations are parts of durations, *i.e.*, are extended over spatio-temporally by durations. This relation of extending over is the fundamental one connecting events. It connects certain pairs of durations, as well as certain pairs of events which are not durations, and durations and the events which are parts of them.

Certain events other than durations have another fundamental relation to a certain duration. They are said to be cogredient with it. This means (a) that their temporal extension is the same as that of the duration, and (b) that they occupy a fixed spatial position within the duration.

The direct apprehension of events by a percipient consists in his discriminating certain parts of the content of his specious present

and regarding them against the undiscriminated remainder. Whitehead apparently holds that the percipient is not only aware in some sense of the undiscriminated background which would ordinarily be admitted to lie in his specious present, but also (though whether in the same sense, I am not sure) of the whole of nature contemporary with this, *i.e.*, with the whole duration.

Events, as we have seen, do not, strictly speaking, change; all that happens to them is that as the course of nature advances fresh durations are juxtaposed on to the front of others. In any duration constituting the content of a specious present the events connected with the mind and the bodily life of the percipient occupy a unique position denoted by the phrase *here-now* in the duration. This event is called the percipient event and it is evidently cogredient with the duration. The ether, according to Whitehead, is the whole continuum of events, and its continuity expresses the facts that any event extends over some and is extended over by other events and that any pair of events are extended over by some third event.

Now there are a great many alternative ways in which a duration can be analysed into events; and the products of different modes of analysis will have different characteristics, *i.e.*, they will be the situations of different types of object. It must not be supposed that there is anything specially subjective or arbitrary about these alternative modes of analysis. We can only analyse out what is actually in nature, and therefore no type of object is more 'real' than another. But some modes of analysis are more useful for one purpose and others for another. The most important modes of analysis lead respectively to events which are situations (a) of sense-objects (*e.g.*, sense-data), (b) perceptual objects (the chairs and tables, etc., of ordinary life), and (c) scientific objects (electrons, etc.). Of these (a) are the simplest (b) the most useful for everyday life, and (c) the most useful for disentangling the laws of nature. But all are equally real in the sense that there really are events in nature which are the situations of objects of each of these types.

Perception is a complicated business. Like all our awareness of objects it implies the power to recognise the same object in different situations (*i.e.*, different events as being instances of the same universal). A perceptual object is an association of sense-objects. Generally we are only aware of a few of these at a time, but they convey the rest. Conveyance is not judgment, but is what psychologists term complication and acquired meaning. On this there supervenes a perceptual judgment, part of the contents of which is that the same object (with certain permissible modifications) would be perceived by other percipients from other situations. If this be true the perceptual object is 'real,' otherwise it is 'delusive'. Analysis reveals the fact that objects are only perceived when certain conditions are fulfilled and that the sense-objects which convey the perceptual object vary with these conditions. The

conditions split up into two classes, generating conditions and transmitting conditions. When a perception is not delusive the situation of the perceptual object is a generating condition for the sense-object through which the perceptual object is perceived.

The scientific object is the result of further reflexion on the generating conditions of the perception of perceptual objects. The perceptual object is thus a link between sense-objects and scientific objects. Its situation is the situation of the scientific objects which are the generating condition for the sense-objects through which it is perceived. Perceptual objects, though useful for practical life, are not of much use for exhibiting the laws of nature. Their identity and their limits are too vague. Hence we have to replace them for scientific purposes by generating conditions of a more definite kind. The study of these generating conditions leads to the concepts of the atom and the electron; the study of the transmitting conditions leads to the ether, which is not a material object but a continuum of spatio-temporally overlapping events.

An uniform object is one that can characterise an event however short its temporal extension, non-uniform objects can only characterise events of a certain minimum temporal extension. A chair (as perceived), or any other perceptual object, is uniform, a tune or a molecule of iron is non-uniform. Now it might seem that the case of perceptual objects leads to a contradiction. They appear uniform, and they are what they appear. On the other hand they are said 'really to consist' of molecules in motion, and these are non-uniform. The answer is that we must distinguish between the apparent and the causal characteristics of an event. The same event is the situation both of the uniform perceptual object which is the chair and of the non-uniform scientific objects which are the generating causes of the chair being perceived in this situation. Some events are the situations only of causal and not of apparent objects, *e.g.*, events in the ether of space.

If we confined ourselves to sense-objects their laws would be wildly complex, involving as they do generating and transmitting conditions, and, among these, abnormal conditions such as excess of alcohol in the stomach of the percipient. The first step away from these complications is the perceptual object, a complex perceived with slight modification by all normal percipients under all ordinary conditions. We cannot however stop there, partly because of the vagueness of perceptual objects, and partly because we are still left with delusive perceptions on hand. The scientific theory then arises with its scientific objects which are causal in character. Scientific objects are characteristics of an higher order than perceptual objects, they are characteristics of characteristics. Their laws are much simpler than any that we have yet met. Though the presence of a perceptual object in a situation does in fact depend, not only on that situation but also on all other events in the world, yet fortunately it depends predominantly on the scientific objects in that situation, in the case of non-delusive perceptual objects at any

rate. Finally, on the basis of what it knows of normal perception, the scientific theory is prepared to deal with the residuum of perception which has delusive objects. It is worth noticing that there is a slight trace of delusiveness in all and a considerable dose of it in some perceptual objects which would usually be reckoned non-delusive. This is because light and sound take some time to travel, so that the situation of the causal components of a given perceptual object is always somewhat earlier than the situation of the perceptual object itself.

From the point of view of science the causal objects seem fundamental and sense-objects mere consequences of them; from that of the theory of knowledge sense-objects seem fundamental and scientific objects mere abstractions from them. The actual truth is that both are equally genuine characteristics of nature, and the differences only rest on the ways in which we get to know them and the use that we make of our knowledge of them.

It is commonly assumed that the ultimate scientific objects must be uniform, in the sense defined above. It is by no means certain that this is true, and in any case non-uniform objects with certain characteristic and recurrent rhythms play a most important part even in pure physics. We can thus see the necessity for some such hierarchy of microscopic and macroscopic equations as Lorentz uses. The electron is uniform; the molecule or atom composed of definite numbers of electrons circulating in definite ways is non-uniform; but once again the collection of many molecules forming a lump of metal is uniform through the averaging out of the rhythms of its component molecules.

Prof. Whitehead suggests, very plausibly I think, that the peculiarity of a living body is that in it we have not a mere average but a macroscopic rhythm. It is obvious that an event characterised as a living being must not be too short; an instantaneous cat is quite as difficult to conceive as Alice found a grin without a cat to be.

I have no space to deal more fully with the philosophical part of the book because I want to try to make the more detailed deductions clear to the reader. To this part then we will now turn.

Events have to each other the fundamental relation of *extending over*, which Whitehead denotes by K . We must remember that an event is best illustrated by a fragment of the content of a specious present. This, in ordinary language, would be said to have some extension both in space and in time. A pair of such fragments may be so related that one spatio-temporally covers the other, and extends beyond it. This is the sort of relation denoted by K . K is an asymmetrical, transitive, relation, and the field of it is assumed to be compact. It is not however connexive, and therefore not serial. This means that, although all events extend over some events and are extended over by others, yet there are pairs of events which do not stand to each other either in the relation K or \bar{K} .

The relation *K* gives us the meaning of *physical* part and whole, as distinct from the merely *logical* part and whole (the relation of a subclass to a class that contains it). The two are often confused, but it is easy to see that they differ when we remember that the physical parts of a whole constitute it by being everywhere adjoined along common boundaries without overlapping. A set of events so related to another event is called a *dissection* of the latter. Whitehead gives logical definitions of dissection, injunction, adjunction, intersection, etc., in terms of *K*.

One of the axioms laid down for *K* is that for any two events there is a third event that extends over both of them. This axiom seems to me to be too sweeping and to contradict an important part of the sequel. There is, as we shall see, a certain very important class of events called durations. Durations can only be extended over by other durations. On the electromagnetic theory of relativity (which Whitehead adopts) there are pairs of durations which are not extended over by any third duration (and therefore not by any third *event*). Thus there are events that do not fulfil this axiom, which ought therefore (unless I am talking nonsense) to be restricted to events other than durations.

We next come to the very important concept of an *abstractive class* of events. We have seen that *K*, when unrestricted, is not serial because it lacks connexity. Now *a* is an abstractive class if (i) *K* with its field restricted to members of *a* is connexive and therefore serial; and (ii) *a* has no minimum with respect to *K*. Thus an abstractive class of events is a series of events extending over each other like Chinese boxes and having no smallest box. By means of such classes it is possible to give a meaning to the notion of 'unextended events' without assuming that there literally are such entities in the sense in which there are extended events. This method is called the *Method of Extensive Abstraction*, and, as it is the foundation of the whole building, it is worth while to be quite clear about it. Mathematicians used to define irrationals as the limits of certain series of rationals. The objection to this is that there is no means of proving that such series have limits at all, and therefore irrationals, so defined, may be in the same logical position as the most perfect being or the present king of France. But it was found that the series themselves, whether they have limits or not, have all the properties that irrationals are supposed to have, provided that suitable senses are given to addition, multiplication, etc. And these new senses are such that addition, multiplication, etc., obey precisely the same formal laws as the addition and multiplication in the old sense as applied to rationals. Thus irrationals are *defined* as those series which were formerly said to have irrationals for their limits. The advantages of this procedure are (*a*) that in this sense, there can be no doubt that irrationals exist if rationals do, for these series of rationals are certainly as real as the rationals themselves; and (*b*) that irrationals, so defined, have all the properties that have

usually been assigned to them. It is true that, *e.g.*, in the statement $\sqrt{2} \times \sqrt{3} = \sqrt{3} \times \sqrt{2}$ the symbol \times has not the same meaning as in the statement $2 \times 3 = 3 \times 2$. But all the formal properties of the two objects denoted by the now ambiguous symbol \times are exactly the same, and these are the only properties that we make any use of.

Now the Method of Extensive Abstraction is simply the application of the same principle to physics and geometry. We should like to think of points, instants, event-particles, etc., as the limits of abstractive classes. But we have not the least reason to think that such limits exist. On the other hand we cannot get on with our geometry or physics unless we are allowed entities with the properties commonly assigned to points, instants, particles, etc. The solution of the difficulty is found in the fact that the abstractive classes themselves (which as series of events of a certain kind are just as certainly real as the event themselves) or, more accurately, certain functions of them, have to each other relations which possess all the formal properties usually ascribed to the relations of points, instants, etc. We can therefore be sure (a) that points, etc., in the sense of certain logical functions of abstractive classes will do all the mathematical work required of such entities, and (b) that, in this sense, they are no more fictitious than events themselves, though they are entities of a higher logical type.

Now there are a great many different entities of this abstract kind needed in geometry and physics, *e.g.*, points, lines, planes, instants, instantaneous volumes, momentary point-events, and so on. Thus a great number of special applications of Extensive Abstraction will be needed to define suitable abstractive classes in each case. To set about this work of definition, Whitehead introduces the concept of *primeness* (and *antiprimeness*) of an abstractive class with respect to a *formative condition*. An abstractive class is prime with respect to any formative condition σ when (a) it itself possesses the property σ , and (b) it is covered by any abstractive class that also possesses the property σ . A class β covers a class α if every event in β extends over some event in α . It is thus clear that a class which is prime is a sort of minimum abstractive class out of all those that have a given property σ . Similarly a class that is antiprime is a sort of maximum abstractive class. Antiprimeness is going to lead to moments by way of durations, since a moment refers to a whole of nature spread out in space. Primeness is going to lead to event-particles, *i.e.*, events thought of as unextended in space and time.

So far no restriction has been placed on the formative-condition σ of our abstractive classes. To define moments and particles we must do this. The restriction is that σ shall be *regular* for primes (or antiprimes). σ is regular for primes when (i) there are abstractive classes which are prime with respect to σ , and (ii) all such classes both cover and are covered by each other. (Two

classes that fulfil the condition (ii) are said to be *K-equal*. K-equality has the usual properties of equality or identity or equivalence.)

We now define an *absolute antiprime*. This is a class which is antiprime with respect to the condition of covering itself. Such a class covers every class that covers it, and is thus a sort of absolute maximum among abstractive classes. Any member of any absolute antiprime is what we mean by a *duration*. For a duration, as we have seen, is the whole of nature contemporary with the content of a specious present. It is thus an event with a finite temporal and an infinite spatial extension. It is clear that an abstractive class containing events other than durations would not cover *every* class that covered it, since it would be covered by certain classes of durations and would not cover these, because the events in it which were not durations (being of finite extent) could not extend over any duration (since that is of infinite extent). Thus if an abstractive class be an absolute antiprime its members must be durations.

Now this formative condition of covering itself, which is the characteristic mark of abstractive classes of durations, is regular for antiprimes. This means that all the antiprimes that cover any assigned absolute antiprime *a* are K-equal to each other. In such a case the logical sum of these K-equal classes (*i.e.*, the class whose members are all their members) is called an *abstractive element*. This is defined as the *moment* determined by the abstractive class *a* of durations. Thus a moment is a certain class of durations, *viz.*, all those durations that belong to any one of a set of abstractive classes which cover an assigned abstractive class of durations.

We are now able to define parallelism of durations and moments, and it is at this point that the question of Newtonian or Lorentz-Einstein relativity enters. If there be a single time-series independent of change of spatial axes, as the classical theory holds, any pair of durations will be extended over by some third duration. But, if Lorentz and Einstein be right and the temporal co-ordinates have to be varied as well as the spatial ones on passing from one set of axes to another in relative motion, it is only the durations of each time series that fulfil this condition; those of two different ones do not. Whitehead adopts the latter view, as indeed we are compelled to do by the facts. He thus gets a definition of parallelism. Durations are parallel when any pair are extended over by a third, otherwise they are not parallel. The moments corresponding to a set of parallel durations are parallel moments. Families of parallel durations and their moments constitute *time-systems*.

I have already said that the supposed existence of non-parallel durations seems to contradict one of the axioms about K. Again we are told that two non-intersecting durations are parallel. I am not clear as to whether this can be proved from the axioms given

about K or whether it is to be accepted on the authority of the Theory of Relativity. It is now easy to give a definition of one moment being between two others and thus to establish a continuous serial order among the moments of any time system.

We are then able to define the instantaneous planes, straight lines, and points of a given time system. If we think of thinner and thinner durations within each other we see that they converge to a total state of nature at a moment as an ideal limit, *i.e.*, to an instantaneous three-dimensional 'snapshot' of nature. Now a pair of non-parallel moments intersect. Thus their intersection will correspond to the intersection of two such instantaneous solids, and will be an instantaneous plane in the time-system of either moment. Such an instantaneous plane Whitehead calls a *level*. (For purposes of illustration we have spoken as if there really were these ideal limits, actually they must be replaced, as always, by the abstractive classes and elements which would commonly be said to converge to them. Thus the level l_{12} is really the class of abstractive classes and elements which are covered both by M_1 and by M_2 where these are two non-parallel moments.)

Levels may either be parallel (if *e.g.*, they are the intersections of a moment by two moments of another time system) or they may intersect. Their intersections are called *rects* and are instantaneous straight lines. Lastly two rects may intersect, giving a *punct*, *i.e.*, an instantaneous point in the spaces of the moments in which it lies. The order of puncts on rects in a time-system α depends on the order of the moments in any other time-system β . Every punct on a given rect falls in one moment of β and every moment of β contains one punct on the given rect. And the order will be the same for a given rect whatever other time-system β , non-parallel to its own, we choose to define the order. Puncts, rects, and levels thus form an instantaneous Euclidean space in a moment of a given time-system.

We want now to pass beyond the restriction to single moments in single time-systems, under which we have so far in the main been working. To do this we define an *event-particle*. Event-particles are connected with absolute *primes* in much the same way as moments are connected with absolute *antiprimes*. Let κ be any punct. Then an absolute prime connected with κ is an abstractive class fulfilling the following conditions: (i) it must cover every class that belongs to κ and (ii) Any class that fulfils condition (i) must cover it. These conditions (unless I am mistaken) are neatly summed up in the form: $a \in \vec{\Gamma}^{\kappa} : p \vec{\Gamma}^{\kappa} \subset \vec{\Gamma}^a$, where a is the class that we are describing, Γ is the relation of covering, and the other symbols have their usual meanings.

It is very easy to prove that the condition just stated is regular for primes; it follows that the logical sum of the class of such classes as a is an abstractive element. This abstractive element is defined as the event-particle connected with the punct κ .

All the event-particles in the whole course of nature form the

points of a four-dimensional manifold (Minkowski's 'space-time,' presumably). For a pair of comomental point-events it is clear that the straight line joining them will be correlated with the rect in the momentary space which joins their puncts. But when point-events are not comomental (*i.e.*, are *sequent* in time), it is necessary to give a special definition of lines joining them. This is done in the now familiar way by (a) defining linear abstractive classes; (b) linear primes; and (c), after showing that their formative condition is regular for primes, linear abstractive classes. These are called *routes* and are not of course in general rectilinear. When certain further conditions are imposed on them they become *kinematic routes*, *i.e.*, possible paths for moving material particles. In a similar way *solids* (which may or may not be comomental) are defined and also volumes.

Any finite event can, in a certain sense, be analysed into the set of event-particles that inhere in it. Of course no event-particle is, in the physical sense, a part of an event, since it is an object of an entirely different logical type. (This accords with the common-sense view that, however long you went on dividing up an event or a solid, you would never reach an event that took *no* time or a piece of matter that occupied *no* space.) But there is an unique correlation between any event and a certain bounded set of event-particles which form a continuum; and again, if one event be a *physical* part of another, the set of event-particles correlated with the former will be a *logical* part of the set correlated with the latter. (This accords with the scientific view that extended events and bits of matter can be treated for mathematical purposes as if they were composed of instantaneous states and unextended particles.)

So far we have considered two kinds of manifold, which have characteristic geometries. (i) The three-dimensional Euclidean space of a given instant in a given time-system. (Its points, straight lines and planes are puncts, rects, and levels.) (ii) The four-dimensional 'space-time' whose points are event-particles. So far we have only defined its straight lines in the particular case of comomental event-particles, and we have not defined planes in it. Now neither of these two manifolds is the space of physics. The first is what we approximate to in an observation as the observation takes less and less time; it is thus the sort of thing that psychologists presumably mean when they talk of a perceptual space. The second is neither space nor time but a manifold compounded of both. To complete the geometry of this and to provide the ordinary space of physics whose co-ordinates are the *x*'s, *y*'s, and *z*'s of our differential equations we need a third kind of manifold. This is the space of a given time-system, and may be called a *timeless space* in the sense that, unlike (i), it is neutral as between all the moments of the time-system to which it belongs.

For this purpose we need to make use of the other indefinable

relation beside K, viz., *cogredience*, which Whitehead denotes by G. An event is cogredient within a duration when (a) any duration of the same time-series that intersects the given duration also intersects the event, and (b) the event has an unchanged position within the duration. Practically this means that, if we regard the duration as the content of the specious present of an observer whose perceptive powers were not limited by the spatial remoteness of events from his body, a cogredient event is a part of this content which (a) lasts through the whole specious present and (b) does not change its position relative to the body of the percipient during the specious present.

By means of abstractive classes of cogredient events we define in the usual way (i) *stationary primes* connected with a given event-particle in a given duration. Then (ii) we prove that the formative condition of such primes is regular for primes and therefore gives rise to an abstractive element. Lastly (iii) we define this abstractive element as the *station* of the given event-particle in the given duration. It will be seen that a station is, roughly speaking, the ideal limit of a set of cogredient events covering the event-particle as these events get thinner and thinner in their spatial extension. A station intersects every moment in its duration in a single event-particle and any one of these particles can equally be taken as the one that determines the station. It can be proved that, if one duration is part of another and P be an event-particle in both, the station of P in the partial duration is a part of the station of P in the total duration. Consequently any station in a duration of a time-system can be prolonged throughout all the durations of that system. The set of event-particles on such a prolonged station is called a *point-track*.

Point-tracks play two parts. They are (a) the, as yet undefined, *straight lines* joining pairs of sequent event-particles in the four-dimensional space-time; and (b) they are the *points* of the timeless space associated with their own time-system. The straight lines of space-time are now complete except for a certain exceptional kind called *null-tracks* (which correspond, if I am not mistaken, to the generators of the fundamental cone in Minkowski's theory). It remains to define the planes and straight lines of the timeless space of a given time-system, and the planes of space-time.

Just as recta are correlated with some (viz., the comomental) but not all of the straight lines of space-time, so levels are correlated with comomental planes in space-time. But this does not exhaust all the planes in space-time and therefore we need a more general conception, called by Whitehead a *matrix*, which shall include both comomental and non-comomental planes. A matrix is either the comomental event-particles of a level, or is the class of event-particles on all the point-tracks determined by any event-particle in an assigned rect and an assigned event-particle not comomental with that rect. For completeness we must also add the event-

particles on the rect through the assigned event-particle which is parallel to the assigned rect. (The reader will observe the analogy of this definition to the definition of a plane in ordinary geometry by a straight line and a point non-collinear with it.)

The elements of the geometry of space-time have now all been defined. It still remains to define the straight lines and planes of the timeless space of a given time-system. A point-track in its own time-system, as we have seen, is a point in the timeless space for that system, for any point-event on it will be in the same station at every moment in the system. The same point-track will intersect the moments of a non-parallel time-system at different stations for each moment in that system. Thus observers in that system will observe a particle moving in a straight line with respect to them. Thus the points of one time-system are the straight lines of any non-parallel time-system. Straight lines in the space of a given time-system can also be defined by means of matrices. If any point-track be chosen the point-tracks which constitute the remaining points of the space of its time-system are said to be *parallel* to it in space-time. A set of parallel point-tracks therefore is a set of points in the space of a single time-system. If the further condition be imposed that the set lies in a single matrix this set constitutes a straight line in the space of the time-system to which they belong.

We may now sum up the information given by Whitehead about the various manifolds that have to be considered in dealing with nature.

MANIFOLD.	POINTS.	STRAIGHT LINES.	PLANES.	PHYSICAL STATUS.
Instantaneous Spaces.	Puncts.	Rects.	Levels.	The ideal limits of perceptual spaces as time is decreased.
Timeless Spaces.	Point-tracks of a parallel family.	Comatrixial sets of parallel point-tracks.	?	The spaces contemplated by physics in its differential equations.
Space-time.	Event-particles.	Point-tracks, null-tracks, and sets of co-rect event-particles.	Matrices, and sets of co-level event-particles.	The space-time of Minkowski.

Whitehead does not, unless I have made an oversight, define the planes of a timeless space, but it would of course be easy enough to do this by means of an assigned point-track not on a given matrix and the set of parallel-point tracks on that matrix.

It still remains to set up a system of metrical geometry and *c*-time-measurement for the timeless spaces of time-systems. In order to use rectangular Cartesian co-ordinates it is necessary first to define normality and then to define congruence. The definition of normality is a long and difficult story. It must suffice to say that it is proved that though any point-event sets of three rects which are mutually normal (in a sense defined by Whitehead) exist. Now it will be remembered that a straight line in the time-system of *a* is a set of parallel point tracks all contained in a matrix of space-time. Any moment of *a* will intersect this matrix in a rect of the momentary space of *a* belonging to the given moment; and each punct of this rect will be occupied by an event-particle which belongs to one of the set of parallel point-tracks that constitute the straight line of *a*-space contained in the matrix in question. Thus there is a correlation between the rect in which a moment of *a* intersects a matrix associated with *a* and the straight line of the space of *a* which is contained in this matrix. The rect is said to *occupy* the straight line. We define mutually rectangular axes in the space of *a* as the straight lines occupied by the mutually rectangular rects through any event particle in the momentary space of a moment of *a*. Thus sets of mutually rectangular axes are possible in the space of any time-system.

It may help the reader if I try to indicate the physical meaning of some of these abstract concepts, even though I reverse the logical order in doing so. A point in the space of *a* would be the position of a particle that stood still as the *a*-time changed. It will thus appear in space-time as a linear series of event-particles parallel to the *t* axis, if we choose the time of *a* as the *t* axis for space-time. All the other points of *a*-space will similarly be represented by point-tracks parallel to this *t*-axis in space-time. Hence the statement that the points of *a*-space are a family of parallel point-tracks in space-time is explained. A straight line in *a*-space will represent the successive positions of a material particle as the *a*-time changes, subject to the condition that these positions are collinear. Each position will be represented in space-time by one point-track, *viz.*, that of a particle which should *permanently* occupy the position in question in *a*-space. We have seen that all these point-tracks for a given system *a* will be parallel. It thus becomes clear that a straight line in *a*-space is represented by a certain selection of parallel point-tracks in space-time. With the same assumption as before about the *t*-axis for space-time we can regard all the point-tracks which are points in *a*-space as forming a kind of solid four-dimensional cylinder in space-time with *t*^a for its axis. A straight line in *a*-space will then be represented in space-time by the generators of this cylinder which lie on any section of it by a plane containing its axis. Such a plane will be a matrix, it will contain one and only one straight line of *a*-space and so will be an associated matrix. And it will of course contain other

families of parallel point-tracks each of which constitutes a straight line in the space of some other time-system. It is evident that the section of such a matrix by a moment of a will be a rect in a . For this means: Take a set of points in the plane such that t is constant. We shall get a set of point-events that are comomental and collinear, *i.e.*, they will lie on a rect of the instantaneous space of the given moment in a . This will be the rect in the instantaneous space of that moment which is correlated with the straight line of a -space contained in the given matrix.

The definition of congruence is again somewhat difficult. The opposite sides of a parallelogram formed of rects in a level are *defined* as congruent, and stretches on the same rect which are congruent with a third stretch are assumed to be congruent with each other. It is then proved that congruence has this kind of transitivity even when the two stretches are not on the same rect. So far, however, we have only defined congruence between stretches belonging to rects or point-tracks of parallel families. To extend it to non-parallel families the notion of normality has to be used. If two rects, or a rect and a point-track, intersect at M and are normal, and if AM and BM on one rect or point-track be congruent, then the stretches joining any point on the other rect or point-track to A and to B are defined as congruent. If a certain assumption be made we can show that on any pair of rects congruent pairs of stretches can be found. It is now possible to set up axes for the space of any time-system. If we further assume it to be a law of nature that the velocity of a in the space of β is equal and opposite to that of β in the space of a , when these are any two time systems, we can measure and compare time-lapses. Prof. Whitehead then deduces the connexion between the co-ordinates x_a, y_a, z_a, t_a of an event-particle with respect to the space and time of a and $x_\beta, y_\beta, z_\beta, t_\beta$ the co-ordinates of the same event-particle with respect to the space and time of β . A certain constant κ is involved in these equations of transformation, and according as it is made infinite, negative, or positive we get a Euclidean (Parabolic), elliptic, or hyperbolic type of kinematics.

If it be made equal to 0, the results clearly conflict even with quite gross observations.) The elliptic type also conflicts with observation. The parabolic type corresponds with the Newtonian theory of relativity and agrees with observations to a very high degree of approximation. It breaks down, however, in certain very delicate experiments (Michelson-Morley, etc.) whilst the hyperbolic type does not. Thus we are practically tied down to the hyperbolic type, where $\kappa = c^2$ and c is the velocity of light. Whitehead's equations then become identical with those of the Lorentz-Einstein theory of relativity.

It is worth while to note that Whitehead has not needed to make the slightest use of light or its velocity in reaching his transformations. The general form of these has emerged simply and solely from considerations about events, their overlapping, and

their cogredience with durations ; the definitions of congruence and normality ; and the assumption about the velocity of one system in the space of another. It is only at the very last stage, when we ask : What particular value of this general constant κ gives us a system of kinematics that fits all the known facts ? that we have to introduce the velocity of light. The existence of such a constant as κ really means that the units in which we measure space and those in which we measure time are congruent with each other.

C. D. BROAD.

VII.—NEW BOOKS.

Aristotelian Society, Supplementary Volume II. : Problems of Science and Philosophy. Papers read at the Joint Session of the Aristotelian Society, the British Psychological Society, and the Mind Association, 11th-14th July, 1919. Williams & Norgate. Pp. 220.

THE Aristotelian Society has adopted the excellent plan of collecting the papers read at certain of its symposia and publishing them in supplementary volumes. This is the second; the first being entitled *Life and Finite Individuality*. The present volume consists of four parts: a long paper by Mr. Russell on *What Propositions are and how they mean*; a symposium on *Time, Space, and Material*, by Profs. Whitehead, Nicholson, and Wildon Carr, Dr. Head, Mrs. Stephen, and Sir O. Lodge; a discussion of the question: *Can Individual Minds be included in the Mind of God?* by the Dean of Carlisle, the Bishop of Down, Prof. Muirhead, and Dr. Schiller; and another on the question: *Is there 'Knowledge by Acquaintance'?* by Prof. Dawes Hicks, Drs. Moore and Edgell, and the present reviewer. The whole constitutes a very interesting contribution to current philosophical controversies. I propose to deal with the three symposia as briefly as possible, and then to give a short account of Mr. Russell's paper, which, whatever may be thought of its other merits, is certainly the most startling in the collection.

Perhaps the most noteworthy feature of the symposium on *Space, Time, and Material* is the singular irrelevance of some of the contributions. Dr. Head gives a most interesting paper summing up the results of his physiological work on cutaneous sensations. Like all first hand accounts of his own researches by a great experimentalist it makes fascinating reading; but I cannot see that it has much bearing on the question under discussion. Sir Oliver Lodge's paper contains nothing that calls for comment, and throws no fresh light on the subject. Prof. Whitehead's paper is a sketch of the ideas which he has since developed in much greater detail and published in his *Principles of Natural Knowledge*. A good deal that is obscure in the symposium becomes clear when read in the context of the book. This contribution is of course the *chef d'œuvre* of this discussion. In Prof. Nicholson too we have a symposiast with a first-hand knowledge and a complete mathematical grip of the ideas and results of modern physics. The result is an excellent paper, in so far as it tells us about the quantum theory, points out the important distinction between the microscopic and the macroscopic, and raises the question whether the concepts that are fundamental in the one region will be so in the other. But, just as Dr. Head's paper is interesting physiology with little bearing on philosophical questions, so Prof. Nicholson's paper is interesting physics leading to no very definite formulation of the question and still less to any definite answer. Mrs. Stephen's contribution is, as usual, Bergson done much better than Bergson could do it himself. She does not indeed, to my mind, succeed in making the French philosopher intelligible, but her attempts are always amazingly clever and remind the present writer of Dr. McTaggart's relation to Hegel, about which one feels that the

disciple is so much better than the master that it is a pity that he keeps up the form of being a disciple. I understand her view to be that science is necessarily stated in the form of words and in terms of universals; that universals are not really exemplified by nature; and that they are definite, distinct, and related,—in a word, 'logical,' or as Bergson, for reasons best known to himself, would say 'spatial'—whilst nature has none of these attributes. No reason whatever is produced for the negative part of this view. The question then arises: How do scientific concepts come to serve us so well in our practical dealings with nature? The answer is as follows: In every phenomenon we can distinguish two aspects, each by itself a fiction, both present in various degrees in different phenomena. One is the factor of mere sensation, the other the meaning which is always conveyed by a sensation. The former can recur, the latter is never exactly the same twice over. The former factor corresponds to material and can be treated by science, the latter cannot be so treated. In proportion as the former predominates in any region of phenomena, science can successfully deal with that region. The second factor is due to memory and is characteristic of mind. The theory appears to me to express certain truths but to express them in a thoroughly confusing way. It is of course true that precisely similar stimuli when repeated produce somewhat different total states of mind. But (a) the stimuli are not themselves 'bare sensations'; they are not sensations at all; and, because it is a fiction to talk of the repetition of exactly similar sensations, it does not follow that there is any fiction in the supposed repetition of exactly similar stimuli. Again (b) because the total state of mind is different on each repetition of the stimulus it does not follow that the sensations are not exactly alike, in the sense that they are awarenesses of precisely similar sense-data. Sometimes the sense-data themselves are modified qualitatively, e.g., in so-called 'complication'. But there is no logical necessity why they should *always* be modified in their sensible qualities merely because they have acquired new meanings; and, in the numerous cases where no such modification can be detected on careful inspection, it seems wholly otiose to suppose that it is really present. The other truth is the following. Colours and sounds may be quite uniform, yet science ascribes them to vibrations of varying frequency. Obviously it takes a number of vibrations in a finite time to give a characteristic frequency. Thus a seen uniform colour corresponds to the repetition of a large number of similar stimuli none of which separately would give a sensation of that colour. Memory is once more called in by Bergson and Mrs. Stephen to produce the rabbit out of the hat. There are several comments to be made on this procedure. Memory is now being used in a quite different sense from that noted above. There is no reason to suppose that the single vibrations produce any sensation at all, still less that a seen colour is the sensation produced by one vibration after this has been complicated with or has acquired a meaning in terms of those produced by the previous exactly similar vibrations. Either memory here 'holds in tension' the vibrations themselves or supposed elementary sensations due to each separate vibration. On the former alternative all analogy with any psychologically verifiable process has utterly vanished. On the latter we must say that, since there is no evidence that the separate vibrations produce any sensation at all, and no reason to suppose that, if they do, these sensations resemble those of colour in the least, it is doubtful whether memory has anything to 'hold in tension,' and still more doubtful whether it could do the work assigned to it. For in those cases where we know that on repetition an actual qualitative modification of the sense-data takes place (and they are the exception) this modification is a comparatively small one, whilst here the difference which memory would have to make would

be to produce a definitely coloured sense-datum out of sense-data which we have every reason to think would have neither this nor any other colour. Finally, we must remember that it is only one particular interpretation of the scientific theory (though it is no doubt the one which most scientists believe) that the vibrations in some sense produce the colour. They may, after all, simply direct our attention to the colour already present in a physical object. The particles of all objects that are really red may vibrate with a certain frequency and the sole function of this may be that it is a factor in causing us to become aware of the redness that is always present in this object.

Prof. Carr in the main agrees with Mrs. Stephen, and, after a very fair summary of the contributions of the other symposiasts, concludes his own with an attempt to show that the modern conception of Relativity was anticipated by Descartes and in some respects more consequently thought out by him and his immediate successors than by modern relativists.

The symposium on Finite Minds and the Mind of God is opened by Dean Rashdall in a powerful paper on the negative side. Common-sense denies that one mind can be a part of another, and it is right. Philosophers persuade themselves to the contrary by thinking that identity of content implies identity of knowing subjects. The difficulty is not diminished in the least by holding God to be timeless; 'we do not understand time, but we shall not understand it any better by talking nonsense about it'. Finally Prof. Pringle-Pattison is gently twitted with a desire to run with the hare and hunt with the hounds in this matter.

Prof. Muirhead holds that, in spite of difficulties, a meaning can be attached to the phrase that finite minds are parts of God's mind, in which this shall be both true and important. After rejecting other possible interpretations, he concludes that such a meaning is found in the connexion between God's purpose and the purposes of finite persons. Dr. Schiller rejects this view, and, in the main, agrees with the Dean of Carlisle. He submits, however, that the facts about multiple personality do offer additional senses in which one mind might be part of another, though they hardly suggest that the relations between God and man on this view would be of a friendly character or that God's mind would compare favourably with those of his creatures. It seems to me that even here there is at most total or partial identity of *content*, together with an immediate knowledge of some things which one person can commonly only know mediately about another. Dr. Schiller says that most religious conceptions, being based on partially inconsistent desires, involve contradictions; but holds that this is no special objection to them, for 'the mathematician thinks nothing of inventing a symbol for an impossible operation like $\sqrt{-1}$. . . ; and when he has done so troubles himself no further with any logical protests'. Dr. Schiller may be right about religion; but he is certainly wrong about mathematics, as half an hour's study of chapters vi., vii., and viii., of Prof. Whitehead's *Introduction to Mathematics* will show him. Dr. D'Arcy contends that it is necessary to suppose that something exists to unify various finite minds, just as (according to him) they unify the material world. Now, as material objects do not lose their own peculiarities by this unification, so there is no need to suppose that finite minds lose their individuality in the unity of God. God cannot be held to be a self in the literal sense, but it does not follow from this, as Bradley thinks, that *nothing* is literally a self; and, since selfhood is the highest kind of unity that we know, we are justified in ascribing it to God *sensu eminentiori*.

In the symposium about knowledge of acquaintance, Prof. Dawes Hicks and Miss Edgell denied its reality, without otherwise agreeing among themselves; Dr. Moore argued that there could be no doubt of the *fact*, though there might be grave doubt as to certain statements made about it by Russell and others; and the present writer attempted to clear up certain

ambiguities in the question and to deal with some of the arguments used by Prof. Dawes Hicks.

It remains to deal with Mr. Russell's contribution. He has been trying his hardest to become a behaviourist. Behaviourists insist that they have no minds; and, although their arguments do not seem to me to prove this modest contention, the fact that they accept such arguments does suggest that at any rate they have none to spare. Mr. Russell indeed admits that he has only been able to persuade himself that his mind, like Mrs. Easy's nurse's baby, is a very little one; and it may be doubted whether he will be able to persuade anyone else of this proposition. I need scarcely say, however, that Mr. Russell's arguments are not to be settled by cheap witticisms of this kind. Substantially his position is this. He is persuaded as a matter of method that both the self and its acts ought to be treated as logical constructions like points and instants, of course without prejudice to the possibility of their being something more than this. His old theory of judgment, and much that he has written about sensations and sense-data, will of course have to go if this position is to be worked out. In this article he is looking for a theory of judgment that shall fill the gap. Naturally the behaviourist view presents itself as a candidate, since behaviourists will have nothing to do with any factors the evidence for which is introspective. He therefore tests the behaviourist theory of judgment much as Cardinal Newman tested the XXXIX. Articles to see how much catholic truth they could be made to contain. He concludes that it is considerably less silly than it looks at first sight, that it contains important elements of truth, and that certain arguments against it which seem highly plausible will not bear scrutiny. Nevertheless he thinks that it breaks down over the empirical fact that there are genuine mental images, and that these at least are necessary for any theory of judgment that will fit the facts. His positive view seems to be that images are both necessary and sufficient to constitute propositions. Both these positions, and more especially the latter, seem to me highly doubtful. Verbal propositions have a meaning in terms of image propositions, and image propositions refer to facts other than themselves, which correspond to them in certain ways, if they be true. There are genuinely negative facts, but neither verbal nor image-propositions are among them; a negative sentence is a positive fact and so is the image proposition corresponding to a negative fact. This has led people (wrongly, as Mr. Russell tries to show) to attempt to analyse away *all* negative facts. Belief, as an act, is a feeling, or rather a class of feelings, associated with certain sets of images. Memory and expectation are special varieties of this feeling, and the difference between them is liable verbally to appear in the content of the proposition. Differences of tense do not really belong to content any more than differences of quality. It is impossible to criticise an elaborate and novel theory, dealing as does this with extremely fundamental points, at the end of a review. I hope to return to the subject in the near future.

There are a few misprints in the book. Two in Dean Rashdall's article make him say the exact opposite of what he evidently means; whilst Prof. Willdon Carr is made to speak of 'illuding' where he clearly means 'alluding'.

C. D. BROAD.

Theophrastus and the Greek Physiological Psychology before Aristotle. By GEORGE MALCOLM STRATTON. London: George Allen & Unwin, Ltd.; New York: The Macmillan Company, 1917.

Theophrastus' work *De Sensibus* is a book of great interest as being the only continuous portion left to us of his great collection, in eighteen books, of *Opinions of the Physicists*, the source from which all the

doxographers drew their knowledge of the Greek philosophers from Thales to Plato and Democritus. The way had of course been prepared for Theophrastus by such reviews of earlier thought as Aristotle frequently prefixes to his statement of his own views. But Theophrastus appears to have gone much more into detail, and certainly he gives us much more detail in this book about the earliest attempts at psychology than Aristotle gives in the *De Anima* and the *Parva Naturalia*. His work is divided into two main parts—§§ 1-58 being concerned with the physiological and the sensory processes and §§ 59-91 with the objects of perception. In the first division of his work he classifies his predecessors according as they explained perception as due to similarity, or to contrast, between the sense-organ and its object. Parmenides, Empedocles, and Plato ascribe it to similarity; Anaxagoras and Heraclitus to contrast. Heraclitus, however, after being thus classified at the beginning of the treatise, is mentioned no further. On the other hand, an account is given of four thinkers not mentioned in the original summary—Alcmaeon and Cleidemus, who belonged to neither of the schools in question, Diogenes, who belonged to the school of similarity, and Democritus, who has elements of affinity with both schools. In the second part of the work, Theophrastus complains that Democritus and Plato are the only previous thinkers (Aristotle being left out of account as above criticism) who have given any detailed account of the objects of perception; of these two thinkers a relatively full account is given. Plato, Anaxagoras, and Diogenes occupy each about a ninth of the whole space, Empedocles a fifth, and Democritus a third. So far as we know, no early thinker of importance on these subjects is omitted. Throughout, criticism is clearly distinguished from, and preceded by, exposition. The exposition is clear, except where textual difficulties stand in the way, and the criticism is trenchant and in the main fair.

Though many passages of the work have been translated and commented on by Profs. Beare and Burnet, the book under review offers the first complete translation and commentary in English, and the thanks of all students of Greek philosophy are due to Prof. Stratton for his careful and valuable work. They are due in hardly a less degree to Prof. Taylor, who has assisted the editor by a detailed criticism, and a discussion of many of the more difficult passages. Where the editor has retained his own view against this criticism he has frequently printed Prof. Taylor's remarks in his notes, so that the reader has the advantage of two interpretations to choose between.

The introduction contains a useful summary, based partly on the *De Sensibus* itself, partly on Theophrastus' other works and on Priscianus' *Metaphrasis*, of Theophrastus' own views on perception; and a judicious appreciation of the method of exposition and of criticism in the *De Sensibus*. The text follows very closely that of Diels—that given in the *Vorsokratiker* for the expository passages, and that given in the *Doxographi* for the critical passages, which do not appear in the *Vorsokratiker*. The manuscripts are full of errors, and the emendatory instinct thus aroused has in some cases been given too free a rein; it would have been well if the editor had recurred to the manuscripts in such passages as the following, where their reading is, if not always as easy as that which has been substituted for it, at all events neither impossible nor improbable:—

§ 8, l. 12. The addition of γίνεσθαι δὲ ταῦτα is unnecessary, if a comma be read after ὕδατος.

§ 9, l. ἐξωθεν may stand. External sounds will then be the ultimate and internal sound the proximate stimulus of hearing.

§ 20, 9. φθεῖραν should be retained. The subject may be either 'the emanation' or 'Empedocles,' φθεῖραν meaning in the latter case 'describe as being destroyed'.

§ 29, 7. The addition of τῶν αἰσθητηρίων is quite unnecessary.
 § 30, 10. τῆς λεπτῆς ἀέρος may stand, as a quotation from Anaxagoras.
 § 31, 8. ἐκ τῶν εὐλόγων is quite possible.
 § 35, 2. οἶον οἱ ψόφοι, χρώματα may stand, though τῶν μειζόνων must be excised.

§ 49, 3, 7. τό should be retained where editors have written τῷ. The retention of a similar τό in § 91, 7 makes it unnecessary to suppose any hiatus there.

§ 54, 2. The addition of ἀκτίνα appears unnecessary.

§ 68, 9. It seems quite possible to retain θερμῷ δὲ καὶ ψυχρῷ καὶ τῶν ἄλλων.

§ 71, 5. πικρᾶς is not needed.

§ 75, 13. Some such term as διαλλάττειν can be supplied in thought without being inserted in the text.

In § 8, 2, Prof. Taylor's very probable emendation being accepted, no hiatus should be indicated.

The editor does not follow Diels's text slavishly, and in some cases his departure from it appears to be justified. There are certain passages where conjectural readings not adopted by the editor are preferable to the readings he adopts, *e.g.*, the following:—

§ 8, 9. ἐπεὶ αἰξήθεν (Usener).

§ 9, 3. τῶν ἔσω ἤχων (Schneider).

§ 25, 8. τῷ κοίλω. Cf. Plac. IV. 10, 2 (Stobaeus) πάντα γὰρ τὰ κοίλα ἤχει.

§ 26, 1. ὀφθαλμοῖς, cf. the datives in § 25, 7, 9, 10 and 26, 3.

§ 35, 7. ὁμοιογένεσιν may be conjectured.

§ 37, 7. The logic of the passage requires some such addition as that of καίτοι (Beare).

§ 39, 6. This passage is undoubtedly corrupt, and some emendation such as that suggested by Diels is necessary. Prof. Stratton's translation of λεπτότατον by 'too attenuated' is impossible.

§ 41, 8. Philippson's reading, which is printed in the text by the editor, is quite impossible, and Diels's καὶ καθάπερ τῇ ὁσφρήσει κὰν τῇ ἀκοῇ is much preferable. If the account already given of smell is thus being referred to, a comparison of this line with l. 3 shows that μικρότερον should probably be read in the earlier line, as suggested by Diels.

§ 60, 5. The difficulties are removed by reading ὁ λόγος.

§ 61, 2. τὰς ολσίας appears to be necessary.

§ 81, 8. ἡμέληκεν διασαφεῖν may be conjectured.

§ 87, 7. Logic plainly requires either the omission of μή or the reading of ἀντιστάμενον for ἀντιμετιστάμενον. The translation takes no account of μή.

There is one general feature of the translation on which a word may be said. The translator has usually indicated by angular brackets the English expressions that have no corresponding words in the Greek. The expedient is a tempting one, but, as he himself implies, it is one which it is not worth while to carry through 'in stubborn consistency,' and it seems better to avoid it altogether. It disturbs the continuity of the impression; and it suggests that the translator has not made up his mind whether the bracketed words are or are not a legitimate part of the translation. In the great majority of cases the words bracketed by Prof. Stratton are such as he would have been justified in regarding as quite necessary to bring out the meaning of the Greek.

The translation is in the main clear and accurate. There are occasional slips, *e.g.*, in § 21, 3, the translation of κῶδων should be assimilated to that in § 9, 3 ('the bell of a trumpet'); in § 90, 10, τὰ ὕδατα should be 'rain' rather than 'water'. But such slips bear a small proportion to the size of the work, and are for the most part not important.

The commentary discusses fully and judiciously all the main difficulties of the work. A few passages may be remarked upon. In note 5, a doubt is expressed whether the 'symmetria' referred to in § 3, 6, is a due proportion of heat and cold or a correspondence with the object to be perceived. It appears clear that whatever be the use of *συμμετρία* by Theophrastus elsewhere, the first meaning alone is in place here. Again it is impossible to share the editor's feeling (n. 127) that 'it is almost too discerning in so naive a psychology' as that of Diogenes 'to declare that vocal difficulties . . . are an important cause of mental inferiority'; surely no great degree of sophistication is needed to discern this. Again too much difficulty seems to be made of the fact that in § 55 Democritus is said to hold that we hear with the ear and not with the whole body, while in § 57 Theophrastus remarks that 'it is absurd . . . to say that sound permeates the entire body and . . . is spread to every nook and cranny, as though perception were due not to the ear but to the body entire'. Surely in the latter passage hearing with the whole body is not ascribed to Democritus as a doctrine held by him, but is put forward as the *reductio ad absurdum* of his doctrine. On § 79 *ad fin.* a note is badly needed to explain why the 'battlemented' and broken shape of the particles of things that are both white and rough should have been supposed to account for their throwing no shadow. Lastly it may be observed that in the difficult passage § 88, 5-7, the editor seems to be right in accepting Philipsson's transposition of *πλείον* and *ἐλαττον*. To the present reviewer, at any rate, Prof. Taylor's defence of the traditional text does not carry conviction. And Prof. Stratton's interpretation of the two *λόγοι* in § 88, 8, as the propositions that a heavy object is one that is borne to an alien place with difficulty, a light one with ease, and that the body with more of kindred substance is heavy, the one with less, light, appears much the best interpretation.

W. D. Ross.

The Justification of the Good: An Essay in Moral Philosophy. By VLADIMIR SOLOVYOV. Translated from the Russian by NATALIE A. DUDDINGTON, M.A., with a note by STEPHEN GRAHAM. London: Constable & Co., Ltd., 1918. Pp. lxiii, 475.

Readers of the recently translated dialogues of this eminent Russian thinker on *War, Progress, and the End of History* should welcome this issue in an English dress of a more systematic work on the whole range of the conduct of life, private and public. The translation is, in the main, admirably done, when allowance is made for two or three peculiarities which seem to show that English is not the native speech of the translators. The chief of these is that in the use or absence of the definite article with abstract nouns, French, and not English, idiom is almost always followed. This peculiarity is so marked that, but for the express declaration of the title-page, one would almost fancy that the rendering had been made through an intermediary French version. The frequent recurrence of compound adjectives formed on a German model, such as "ethically-religious," "individually-social," is also a mannerism which is unpleasant to our English taste, though Americans apparently do not object to it. But for these two singularities, and a few unusual equivalents for classical proper names, the book reads almost like an original work in our own language.

Space will not permit of anything like a full review of a work which covers the whole ground of the "practical" life. But I should like to commend Solovyov's book to all students of ethics and religion precisely because, while it has so much in common with a great deal of the best re-

cent British work in these fields, the writer's special point of view is often not quite that which is most familiar to ourselves. Thus such topics as Hedonistic or Naturalistic Ethics are treated on lines which are very much those of Green's *Prolegomena to Ethics*, a work apparently unknown to Solovyof, and the discussions of economic problems in the eighth chapter (one of the most suggestive) have a marked general affinity with Ruskin's treatment of the subject. But there is always, among the closest resemblances to Green and Ruskin, the note of subtle differences, due partly, one supposes, to the Russian nationality of the author, partly to the traditions of Eastern Christianity. The ascetic element in the moral life gets a prominence which seems a little strange to the Western moralist, who perhaps tends to an undue depreciation of the worth of "discipline"; the value of institutional religion is very strongly insisted on, and the eschatological hope of the ultimate "redemption" of the world of body itself is displayed as indispensable to any real "justification" of good. All this will strike most of the English readers who are in general sympathy with the author's views on Ethics as unusual and exaggerated, but for that very reason it is desirable that they should be led to ask themselves the question whether there is not something, both in eschatology and in institutionalism, which is fundamental in really spiritual morality and religion. If we are inclined to think that the traditions of the Eastern Church have led Solovyof into exaggeration in these matters, it is at least possible that our own very different traditions have led the followers of Green into an unduly low estimate of what Solovyof prizes so highly.

There is one very interesting point in the treatment of the elementary facts of conduct which fills the first five chapters on which I may perhaps make a remark. Solovyof finds the primitive roots of moral behaviour in three feelings, those of shame, pity, reverence, which prove to be the basis of our duties to ourselves, to our fellows, to God. It is characteristic in a writer who seems always uneasy in presence of the fact of sex that the feeling of shame or modesty in all its forms is declared to have a sexual origin; shame is the feeling that in some way our sexual life and all that pertains to it are unworthy of us. I do not propose to raise the questions whether this conviction is either common or justifiable, though it is obvious that both questions might demand very careful discussion. But I should like to point out that the linguistic evidence upon which Solovyof bases very far-reaching inferences is valueless. He makes it the main proof of the universality of the feeling that in several languages, Greek, Latin, Russian, French, German, the generative organs are commonly called the "shameful" part. (I might object against him that the expression is *not* usual in English.¹) Now, in the case of three languages out of these five, Latin, French, German, it is manifest that the words appealed to, *rudenda*, *parties honteuses*, *Schambeil*, are mere translations of the Greek *aidôion*, and presumably the Russian word has the same source. The evidence is thus reduced to the single fact that in Greek the name for this part of the body is *aidôion*. But does *aidôion* mean the "shameful" part at all? It seems to be the neuter of the adjective *aidôios* used substantively, and it is safe to say that *aidôios* in Greek does not mean *αἰσχρός*. It is an epithet applied to "old men," to "maidens," and (by Plato) to Parmenides. Its real sense thus appears to be "deserving of respect," and *τὸ aidôion* seems to be called so, not because it is something of which the Greek felt ashamed, but—like an Archdeacon—because it is the "venerable" member. (It

¹The corresponding English is "privy parts". Since we also say "Privy Council," it is obvious that the English adjective is not necessarily "dyslogistic".

would be "venerable," of course, because of its connexion with the perpetuation of the life of the kin from one generation to another.) Probably, then, the contention that a feeling that there is something degrading about sexuality is one of the roots of universal morality is based on nothing more than the mistranslation of a Greek word.

I should like to call special attention to the excellence of the chapters on the connexion of the moral problem with the economic (c. 7), the relations of morality and law (c. 8), and the moral significance of war (c. 9). Two thoughts in c. 7 specially appeal to myself the observation that Christianity and Socialism are necessarily incompatible, because Christians pity the rich, but Socialists envy them, and the striking suggestion that in a sound solution of "the economic problem" it will be recognised that the cultivation of the earth is a duty not only to ourselves and our fellows, but to the earth itself. Its "redemption" or *oũ éreka* is precisely to be made by man's loving labour to "blossom like the rose".

A. E. TAYLOR.

The Problem of Space in Jewish Mediæval Philosophy. By ISRAEL ISAAC EFROS, Ph.D. Columbia University Oriental Studies. Vol. xi. New York: Columbia University Press. London: Humphrey Milford.

The work of the Jewish philosophers of the Middle Ages has attracted attention in recent years, partly as a department of Jewish literature, partly because of the revival of interest in Mediæval Philosophy generally. As Syriac scholars had transmitted the heritage of Greek learning to the Arabs, so at a later time the Jews were the intermediaries, when the debt to Europe was repaid not without interest, although there was also a certain amount of direct contact between Arabs and Latins as there had been between Arabs and Greeks. Accordingly if we desire to know, how Greek and Arabic philosophy influenced Scholasticism, we must take the Jews into account. Besides acting as intermediaries, Jewish philosophers no doubt also made a contribution of their own, although it has not yet been determined with sufficient precision, to what extent they were original.

Unlike the work of Husik, which was reviewed in *MIND*, No. 105, the present volume is only concerned with a particular group of problems, those relating to space, so far as they appear in Jewish Mediæval Philosophy. Starting from Plato and Aristotle, Dr. Efros shows by quotations, how far their doctrines were accepted or rejected by the authors he is discussing. It is by no means easy to determine exactly, what Plato thought about space. His doctrine about it has to be gathered principally from the *Timæus*. And there he expresses himself with vagueness and hesitation, as though he had not worked out his theory to a satisfactory conclusion. Aristotle is more precise and more intelligible, but for that very reason more vulnerable. If Dr. Efros is right, Plato did not intend to identify matter and space, but differed from Aristotle in not holding, that space was terminated by the outermost celestial sphere. On the whole Jewish Mediæval thought agreed with Aristotle, although there are some instances to the contrary, *e.g.*, the practical identification of matter and space by Isaac Israeli, who is quoted (on p. 38) as saying, that "tridimensionality is matter, and matter tridimensionality," and Abraham ibn Ezra's (1104-1167) adherence to the Atomism of the Mutakallimūn. Gabirol,¹ a vigorous and original thinker, had a theory of his own about

¹ Solomon ibn Gabirol (1021-1058), Neoplatonist.

matter and space which was certainly not Aristotelian and was a refinement upon the pseudo-Platonic view of Isaac Israeli. He held, "that extensity is the form, which combines with the original undefined hylic matter". The most thorough-going opponent of Aristotle mentioned by the author is Hasdai Crescas.¹

Among the special problems discussed in the book are the nature of empirical space, atomism, absolute space, the existence of void, and the meaning of infinity. The inevitable antinomies of Zeno of course recur to baffle the author no less than Saadya (892-942) and other Mediæval philosophers. According to Dr. Efros, the most valuable contribution of the philosophers he discusses to the theory of space consisted in their treatment of infinity. Aristotle had maintained, that space unlike time, though infinitely divisible, was finite. Maimonides (1135-1204), Narboni, Gersonides, and Hasdai Crescas between them worked out a theory of infinity, which Dr. Efros expounds as follows²: "What then does infinity mean? It represents a process that may be carried endlessly without destroying the object; just as finitude represents such a process that will ultimately reach a limit, the crossing of which would spell injury to the object. It is in this sense that we say matter is infinitely augmentable, meaning that we can enlarge and further enlarge a given magnitude of matter *ad infinitum*, without ever producing an infinite magnitude, because that would mean the loss of matter which is by nature limited and circumscribed. Indeed, it is absurd to believe that such an infinite will eventually be reached, because then the process will cease, infinity being unaugmentable, and the process will therefore be finite. Hence an infinite process presupposes finite results, and as one Jewish thinker cleverly remarked: Matter is infinitely finite. Similarly infinite divisibility denotes that the process of division may be carried on theoretically *ad infinitum*, without bringing about the loss of the object."

The following quotation given from Abrabanel³ (p. 86) certainly shows, as Dr. Efros observes, "a strong note of modernity". "It is impossible to conceive the beginning of time without a pre-existent time. Also the limitation of the material world is inconceivable without a beyond-existing place. But this difficulty of conceiving temporal or spacial finitude is purely mental, and does not disprove real finitude. . . . But after a certain amount of reflexion the mind can correct this error arising from perception, and can rid itself of its acquired *habit*, and come to realize that reality is not absolutely conditioned by those relations." Abrabanel would have appreciated the "evolutionist theory of axioms" condemned by the late Prof. J. Cook Wilson.

On the whole it may be said, that Dr. Efros has produced a useful monograph upon a subject not readily accessible to the majority of readers interested in philosophy. The work would have been improved by a chronological table giving the dates of the Jewish authors reviewed. And it is impossible to decide, how far any particular author is original or not, without a fuller investigation of Arabic and later Greek philosophy than Dr. Efros appears to have made. He tells us a good deal, it is true, about the theological atomism of the Mutakallimun. But as is clear from de Boer's *Philosophy in Islam*, there were plenty of other types of Muhammadan philosophy besides. May not some of the Jewish divergences from Aristotelian orthodoxy have been influenced by Ghazzali, whom Dr. Efros does not even mention? Again it is impossible to estimate the permanent

¹ Hasdai Crescas (1340-1410), author of *Or Adonay*, who had a great influence on Spinoza.

² P. 114.

³ Don Isaac Abrabanel (1437-1509).

value of Mediaeval theories of space, unless they are compared with the results of quite recent investigation. It is not enough to point out their obvious contrast with the views of Kant. No one would ever have expected them to foreshadow his Copernican revolution. But even a non-mathematician in dealing with the problems of infinity might be expected to show some acquaintance with the results of such authorities as Cantor and Dedekind and Bertrand Russell.

C. T. HARLEY WALKER,
(assisted by PAUL PHILIP LEVERTOFF).

Rousseau and Romanticism. By IRVING BABBITT, Professor of French Literature in Harvard University. Boston: Houghton, Mifflin & Co. Pp. xxiii, 426. 17s. net.

The author believes a true insight into reality to depend on a just treatment of the imagination. He remarks suggestively on the recentness of reflexion on the creative imagination as such, but fails to note that in Shakespeare himself the idea is quite definitely emphasised. His book might have been a very good one. He has very great knowledge of French literature, a knowledge with which I could not compete for a moment. If he had defined or distinguished his antithetic principles with philosophical insight, and had traced the decadence of which he complains with caution and precision among French romanticists and German votaries of Irony, we should have had good reason to thank him.

But as it is, he has picked up his "laws" uncritically; he has not distinguished them intelligibly; he has expanded his polemic into some of the worst and wildest literary criticism that it has ever been my painful duty to peruse. Here it only concerns us as the consequence of philosophical confusion.

His two laws he states in terms of Emerson. They are the law of man and the law of thing. In art and literature they correspond respectively to (a) humanism, classicism, ethical imagination, art that recognises a centre, a control, a conscience which is essentially negative—a veto, and (β) expansive imagination, romantic, naturalistic and scientific, uncentred, uncontrolled, conscienceless and unrestrained, Arcadian, amoral (this last is my term not his). And the thesis is that since Rousseau and Goethe's Werther the European imagination, determined largely by a reaction against pseudo-classicism and Cartesian mechanism (I daresay there is something in this), has been rushing down a steep place into chaos.

What are the two things contrasted?

The ethical or restrained imagination and the unrestrained uncentred imagination—classicism and naturalistic romanticism. Of course the student asks at once, but what of the beautiful imagination? Why go into another genus for your restraint, and bring in conscience, negation, and ethical purpose? Has beauty, then, no centre and no law? Obviously we are here confronted by mere philosophical inexperience.

And then the extravagances. On Werther and Tieck, Rousseau, and Chateaubriand, and plenty more, the author is clear, incisive, instructive. I did not know that Rousseau originated or at least employed the phrase 'l'art pour l'art'. I quite accept the fact from Prof. Babbitt. Only, there is not a word of Rousseau's political writings, and perhaps they are not quite in the picture. But we must remember that they obviously echo Spinoza, and I should have thought he was ethical and centralised enough for anybody. The story about Rousseau's children is far from well supported.

But outside this range, nearly all our great recent poets are drawn into

his wandering sermon by the author's quaint confusions. Goethe's *Faust* destroys the roots of the distinction between good and evil by equating the devil with the spirit of denial¹; for the spirit of denial (veto) is the essence of conscience. Browning's magnificent "O lyric love —," the dedication, and climax of the Introduction, in the *Ring and the Book*, is, if I can believe my eyes (p. 212), treated as spoken by Caponsacchi, and winning our sympathy for him by its "lyrical intensity" "though not of the highest type" of poetry. Blake, Shelley, Wordsworth, Victor Hugo, go down in the common ruin. And all because the critic does not understand how to look for positive beauty (he likes to call himself a positivist) on its own definite and determinate ground. A modest and sensitive critic might undoubtedly have something instructive to say about extravagance in the poets I have mentioned. F. W. H. Myers treats the problem with care and delicacy in relation to Shelley.² But to say that "Shelley has passages especially in his 'Adonais' that are on a high level!"³

BERNARD BOSANQUET.

Conscience and Fanaticism: An Essay on Moral Values. By GEORGE PITT-RIVERS. London: William Heinemann. Pp. xvi, 112.

The writer says he wishes to contribute "towards an understanding of the mental state or attitude we call fanaticism, for the purpose of guarding against the catastrophes it begets". But he discusses a good many other topics more or less relevant, including Moral Judgments and Obligation, Morality and Religion, the Laws of Suggestion, and the Nature of Valuation. If he does not claim to be a philosophical expert, Mr. Pitt-Rivers has pronounced opinions of his own, and is inclined to be dogmatic. It would not be very easy to reduce his opinions to a coherent whole.

The author denounces the appeal to conscience, the refuge of orthodox and fanatic alike, and vigorously repudiates the religious view of conscience. Conscience is not absolute, rests on variable grounds, and is a blending of several elements. A moral standard is needed, but Utility adequately supplies that, while the end is justifiably conceived as pleasure or happiness. In another place the expansion or realisation of the self seems to be suggested as the end. The writer, however, denies that pleasure is always the motive, though he does not explain how motives are to be appreciated unless it be by their consequences. He surprises us by calling truth an *a priori* and self-evident good, and seems to suppose that in no circumstances can deception be justified.

The discussion of values and valuation is interesting, if unconvincing. The instinctive and emotional elements which enter into valuations lend them no validity—a disappointing thing, since we are told that there are few people whose views are not chiefly emotional values. Mr. Pitt-Rivers would probably regard his theory of Cosmic Suggestion as his most original contribution to the problem of life. He distinguishes the conscious and the sub-conscious as two minds with different attributes—a very crude conception. The sub-conscious mind is in constant rapport with a vast psychic environment from which suggestions proceed. These prevail, for mass tells against the single mind. Suggestions from this source explain public opinion and mob-psychology, and are utilised in the successful appeals of demagogues and fanatics. As apparently the

¹ P. 360.

² Ward's *English Poets*, vol. iv.

³ P. 358.

individual has very little power of controlling these 'cosmic suggestions,' the outlook for society appears to be depressing. One can only draw comfort from the thought, that reason plays a larger part in forming public opinion than the writer supposes.

G. G.

Philosophical Currents of the Present Day. By Dr. LUDWIG STEIN. Translated by SHISHIRKUMAR MAITRA, Director, Indian Institute of Philosophy, Amalner. Vol. I. Published by the University of Calcutta, 1918. Pp. xi, 234.

A translation by a Hindu of a German history of philosophy, published in Calcutta in the middle of the great war, appears to be something of a portent. Does it mean that in these days only Hindus have the leisure to philosophise, and the means to produce cheaply books for which there is not likely to be a popular demand? Does it mean that though as heretofore only Germans will have the patience to compile histories of philosophy, their translators will henceforth come from India, and no longer from America? That might be something of a gain, for Mr. Maitra's translation is distinctly above the level of the ordinary American translation. On the other hand, it has many misprints, like most Indian-printed books. As for the quality of Dr. Stein's philosophic history, *Philosophische Strömungen der Gegenwart*, which is carried to 1908, it is not so preponderantly Teutonic in its outlook as is usual in German histories, and has e.g., a long chapter on Pragmatism, under the title 'The Neo-positivistic Movement'. For the rest it is of the Überweg-Heinze type, i.e., full of names and information, and has the further merit of being readable. It is also about as trustworthy as other histories of philosophy. That, however, is not saying much. For history is always a *fable convenue*, more or less. It has always to select, and naturally selects what seemed important at the time to the historian. But a consequence is that whenever a new question crops up, as happens occasionally even in philosophy, not only does the historian show himself ludicrously incapable of placing it, but the old histories never enable one to trace it to its germs and first appearances. For these are precisely among the things that were passed over as unimportant. Another failing of the philosophic historian is to exaggerate the amount of logical connexion between the doctrines he catalogues. He tends to suppose that every later writer has read and pondered on all his predecessors and all their problems. Whereas he usually is acquainted only with a few of them, and can be original only for this reason. A philosophy, moreover, is essentially an individual product, and its comprehension demands the insight of a psychologist who can penetrate through its logical *camouflage* to the personal 'vision,' and the often accidental and ludicrously inadequate circumstances that set its author thinking. It is well therefore not to expect too much from any history of philosophy.

F. C. S. SCHILLER.

La Réforme de la Conscience. By P. DECOSTER. Bruxelles: M. Lamertin, 1919. Pp. 91.

There is something of the intensity and sincerity of the seer in this little book. It is an individual and striking piece of work, extremely well written, with its roots deep in the history of philosophy. There are three chapters. Ch. i. contains the negative thesis, developed in detail in ch. ii.; and the third chapter contains the positive doctrine. The impulse to philo-

sophy is the unrest due to the contrast between the free creation implied in action and the universal determinism to which reflexion leads. This unrest—inquietude—man attempts to get rid of by intellectual discipline. The history of philosophy shows this attempt in detail. It is M. Decoster's negative thesis that the attempt fails, and necessarily fails. Philosophy as an attempt at insight into ultimate reality is self-contradictory (ch. i.) and the history of philosophical systems (rapidly run through in ch. ii.) culminating in Hegel's Dialectic, which for M. Decoster is the only possible outcome and final type of a rationalist philosophy, shows the failure in detail. Nor can intellectual intuition succeed where rationalist philosophy has failed.

But, and here is the entrance to his positive thesis, if philosophy is not completely rationalistic, there is no alternative for it but *aventure*. And this means, a resolute acceptance of the *inquietude* which gave rise to the rationalistic attempt, as the supreme reality, and a full submission to it, letting it take us whither it will. It will lead us to a discipline, not intellectual, but moral; in a word, it will bring about *la réforme de la conscience*, which M. Decoster, in harmony with Spinoza, identifies with the task of philosophy truly understood.

The problem of philosophy is no longer one of synthesising elements given to thought from outside (constructive synthesis) nor of seizing the nature of reality by an act of insight (speculative intuition): but one of synthesising *in the self* the various elements which belong to the self; entering into full possession not of an external reality, but of oneself, which can be possessed only by being created (intuition immanent to consciousness). Such an intuition is essentially action. "*La notion même de réalité lui demeure étrangère*" (73). To make intuition relative to any reality external to itself is "*faire violence à la nature même de l'acte d'intuition*" (74). Intuition so conceived is simply "*la traduction en langue moderne de la connaissance du troisième genre de Spinoza*" (75), though Spinoza, of course, was intellectualistic.

As M. Decoster describes it, the process seems at first sight curiously self-centred; in which the self stabilised by *joie* and driven onwards by *inquietude*, gradually brings into a unity of interpenetration the various elements which at the start were but held loosely together. This impression, I think, is not entirely correct; for *jote* and *inquietude* for M. Decoster are not mere subjective states but elements in genuine thought. We have, however, found his account of thought (*pensée*) not easy to follow. The main idea seems to be that while thought is essentially synthesis, the elements synthesised cannot be externally given, if the synthesis is to have intrinsic value, nor can they be given internally, if the synthesis is to have reference to any external reality. Insist that the synthesis is to have intrinsic value, cut off the reference to an external reality as the end toward which the synthesis is directed, and you are left with a synthesis of elements original to the self, resulting in genuine self-creation. The doctrine appears most clearly in the account of *joie* (pp. 69-70). Joy is the fundamental significant content of the self; inquietude the supreme reality in the self making for change. The interaction of the two (the expression is not exact) results in each taking on something of the character of the other (interpenetration of joy and inquietude) and in the formation of joys into a system (*la participation des joies entre elles*) exactly analogous in all points to the system of thought which philosophers have vainly endeavoured to erect. It is inquietude which connects joy with joy. Now "*la joie, dès qu'elle est pénétrée d'inquietude, participe de la pensée. Mieux encore: elle est pensée*" (69). "*L'inquietude est le lien de nos joies; la joie, le véhicule de nos pensées*" (68). "*Les joies font corps avec la pensée dont elles sont les rayonnantes productions ou . . . les 'fulgurations'*" (70).

Inquietude then is that in man which corresponds to the activity of free creative thought; the joys synthesised through it are profoundly modified by it; it itself becomes modified in the process. The synthesis of data into a system of knowledge, attempted by philosophy hitherto, is a failure; in its place we have a synthesis of the various elements of the self into a genuine self. All action, all science, are relative to this end. The philosophic problem is a moral problem.

The final stage is intuition, "l'acte par lequel la conscience conçoit et prolonge à l'infini la participation de ses éléments constitutifs" (73).

The synthesis of ourselves achieved, new problems open up. All existence is consciousness, bound together in certain relations by which at first man is enslaved. But by synthesising himself he frees himself from his bonds, and he can then endeavour to "substituer enfin, à la solidarité tyrannique des existences, la communication réfléchie des consciences" (89). Perhaps this final problem will be insoluble. But success or failure cannot affect what has been accomplished. The spirit of philosophy is neither optimistic nor pessimistic, but adventurous. There is no supreme being. Perfect existence is a contradiction in terms. "Il n'est d'éternité que celle que nous possédons pour l'avoir arrachée à une pensée infiniment riche, infiniment indifférente à ses richesses comme à nos besoins. Ce que n'obtiennent pas nos prières, notre audace le conquiert" (91).

What we hope to see developed by M. Decoster is a closer connexion of his whole doctrine with man in his social environment, and the clearer setting of the stage on which the whole drama is enacted. For the whole of the elements with which the present book deals are within self-consciousness. And the external world is resolutely taken as spiritual. But if so, what is the nature of its activity? If it is to be interpreted analogously to the self-conscious activity described in this book, then the extension and generalisation of the concepts of *inquietude*, *joie*, and *pensée*, are urgently called for. Nor is this all. The process as described falls entirely within the individual's own consciousness and does not involve reference to society. This seems mainly due to the fact that M. Decoster is considering the process from its formal side; but if the formal (*i.e.*, essential) nature of the process of self-realisation does not involve any reference to the social environment, then the social environment must be accidental. The work would I think be improved by a closer reference to this point.

L. J. RUSSELL.

Das Reisetagebuch eines Philosophen. By COUNT HERMANN KEYSERLING.
Munich and Leipzig, 1919. Pp. xxviii, 670.

This book is best described as a philosophic 'Pilgrim's Progress'. It is the diary of a globe-trotting philosopher who made the grand tour in the year 1913 visiting Ceylon, India, Singapore, China, Japan, Hawaii, and returning via America. The author, an Estonian nobleman and a striking and brilliant figure at the international Congresses of Philosophy in the Golden Age before the War, after publishing a number of interesting books, which must evidently be regarded as experiments with Western thought, set out to explore the fabled wisdom of the East, in order to deepen his self-consciousness, in the hope, that, as he says, the way round the world would prove to be the shortest way to come to himself. So he determined to be impressionable, to keep his mind open to everything he saw and heard, and to reflect, and reflect on, the *genius loci* and the spirit of the people wherever he might chance to be, cultivating as far as possible the society of the natives and abstracting from the vulgarising grip in which

European civilisation now holds the East. It follows from this plan that the primary interest of Count Keyserling's book is neither geographical nor logical, but psychological. Neither scientific accuracy nor logical consistency are essentially his aim. The one is excluded by the shortness of his visits and the linguistic obstacles to free communication of thought—for though Count Keyserling is a superb linguist, he can hardly (despite p. 45) have conversed with the representative thinkers of Ceylon, India, China, and Japan in their own tongues and without the treacherous aid of the interpreter—the other by the determination to *sympathise* with all the incongruous creeds he encountered. Hence, as the preface indicates, the book must be read as a psychological romance, for its suggestions and self-revelations, and not for its doctrines. 'Hic liber est in quo reperit sua dogmata quisque'—they must all be understood to be relative to the atmosphere which the author happens to be breathing. If read in this spirit, the book will be found highly enjoyable and full of suggestions and *aperçus* that are worth pondering; but it stands to reason that it offers insuperable obstacles to the serious-minded systematic critic, and easily eludes his clumsy efforts. The only thing for a reviewer to do is to select *dieta* which seem to him worth noting, and to indicate what conclusions the author finally came to when he returned home and came to himself.

I would draw attention therefore to the author's experiments with 'Raja-Yoga,' which repeatedly enabled him to rise to the contemplation of universals as real objects and so to confirm the Platonic Theory of Ideas (p. 240), his feelings of himself as a 'Proteus,' incarnating in various forms but never identifiable with his temporary impersonations (p. 291), his discussion of the cruelty instinct (p. 334), his meditation on the immortal in man (pp. 526-527), the connexion he traces between intellectualism and lack of creative personality (p. 426), his antithesis between the Westerners as doers and the Hindus as understanders (p. 594). All these reflexions are striking, though (or perhaps, because) one cannot wholly agree with him. Especially if one does not share one tacit assumption that runs through all his writing, *viz.*, that the metaphysical or ultimately real must be something *χωριστόν*, something apart and alien from the flux of becoming, attainable by a distinctive method of its own, which whether it be a *priori* reasoning, or (as seems more attractive) mystic ecstasy and concentrated meditation, has no point of likeness or contact with action and with the scientific and technical procedures by which men can in fact attain their ends and realise their ideals.

But for this presupposition it would not be so facily evident to Count Keyserling that "there is no necessary connexion between the philosophic value of a conception and its significance for life" (p. 594); as it is, he keeps on relapsing into the absolute dualism of theory-or-practice; he must look up to the Hindu sage, though he seems more of a beast than of a god; he cannot look forward to a future in which science will not only have endowed man with power over nature but have enabled him to tame, control and remould himself nearer to the heart's desire. In spite of this prejudice, however, it is remarkable that when he gets back to his native soil he realises his oneness with a universal which is over-individual and super-national and yet 'no abstraction' (p. 648), and then decides to be a 'Boddhisatva,' that is a Buddha who declines to abandon the world and to enter Nirvana, so long as there is a single earth-bound soul to save. This surely is a way—a roundabout way, doubtless, but the only way possible, if one starts from Buddhist premises—of confessing the *inferiority* of the ideal of contemplation to that of action. Unfortunately it hardly seems a practical way at present. For the social convulsions which have followed in the wake of the War throughout Eastern Europe and are threatening to spread westwards have left to members of the former ruling

classes little or no sphere of activity; and history shows that under conditions of collapsing civilisation the brightest and most cultured spirits are driven from action into contemplation, to the lasting loss of the world.

F. C. S. SCHILLER.

Introduzione allo studio delle opere di Benedetto Croce. Note Bibliografiche e Critiche. By GIOVANNI CASTELLANO. Laterza e Figli, Bari, 1920.

This book is not very happily named, nor is it very admirable in its conception. It is evidently the work of an enthusiastic student zealous for the master's fame, but it reads like a publisher's catalogue followed by expansive laudatory press notices. At the same time it is an exceedingly valuable book and cannot but prove interesting for the positive information it provides concerning one of the foremost philosophers and a most notable leader of living thought. Benedetto Croce is a strange phenomenon. From his youth (his earliest publications were, we are told, in his seventeenth year) he has been pouring forth a stream of literary and philosophical work, and none of it is hack work. We have not to select the good from a heap of rubbish. There is no rubbish. We may say that literally everything Croce writes is characteristic and original. It is curious also that he himself is not self-assertive, and it is clearly not a craving for publicity which makes him produce so many books. This is very beautifully shown in his *Contributo alla critica di me stesso* which he published privately in 1918, printing only one hundred copies for his friends. A French translation of this appeared in the *Revue de Métaphysique et de Morale* for Jan.-Feb., 1919. It exhibits him as almost shrinking from publicity and yet unable to resist the impulse to give his life and thought a literary expression which seems to flow as continuously as the life and thought expressed. I have my own theory. It is that Croce illustrates in himself, better than in any example he has given in his books, his æsthetic theory of expression. He is really a great artist, experiencing the continual need and overpowering impulse to find outward expression for his inner intuitions, and fortunately possessed of the material means for such expression in literary activity. If this be the true theory Croce will go on producing literary work so long as he lives and thinks, and the task Signor Castellano has set himself is a truly formidable one. He evidently contemplates new editions of his book keeping the record complete, and he looks forward also to the increasing fame which Croce's achievement is gaining. We may therefore be very grateful to him for what he has done and encourage him in what he still hopes to do. The book contains a very excellent portrait of the philosopher.

H. WILSON CARR.

Lo Spirito Evangelico di Roberto Ardigò. By GIOVANNI MARCHESINI. Bologna, 1919. Pp. 123.

A brief account of the life and ethical teaching of the distinguished Italian Positivist who died last year at the age of over ninety. Mr. Marchesini's brochure gives an eminently attractive picture of his master's personality, and calls attention to some close resemblances between the moral doctrines of Ardigò and the precepts of the Gospel. As a former priest of the Roman Church, Ardigò was naturally exposed for the greater part of a long life to the unremitting hostility of the Italian "clericals". Mr. Marchesini bears witness to the dignity and self-restraint with which he bore himself under coarse and violent attacks, as well as to the cheerful fortitude with which he supported a life of extreme poverty. It is gratifying to learn from the account of the old man's last

months that so honourable a career was not ended, as some of our newspapers reported, by suicide. The truth appears to be that Ardigò did once, some months before the end, make an unsuccessful attempt at suicide in the depression caused by the reverses to Italian arms and the fear, natural in an old and enfeebled man, of helplessness in the face of an Austrian occupation. Fortunately he was rescued in time and lived long enough to witness the national recovery. Much allowance must, no doubt, be made for an Italian writer exasperated by bitter "clerical" attacks on a venerated teacher, but I could wish that in his attitude both to the orthodox and to philosophical opponents of Positivism, Mr. Marchesini had copied the self-respecting courtesy which, as he tells us, was practised by Ardigò. All orthodox Christians are, after all, not "perfidious," nor all critics of Positivism charlatans or "pro-Germans". Mr. Marchesini seems to me a little too ready to doubt the good faith of those of us who do not regard religion as a mere "psychological fact" or cannot accept the Positivist theory of the methods and limits of science. With respect to the parallel he draws between the teachings of Ardigò and those of the Gospel, I would respectfully suggest that it rests a little too much on the assumption that the real Christ is the Christ of *Ecce Homo* rather than the Christ of the Evangelists. One may think that humanitarianism is a better thing than "theological morality," and that "love your neighbour" is a rule which needs nothing more to make it into a complete guide to right action. But it is unhistorical to forget that in the Gospel the *first* commandment is "love God". A "humanitarian" Christ is not precisely the Christ of the New Testament. And I think Mr. Marchesini a little unjust to "theological morality,"—though not altogether without excuse. Religion, he holds, infects morality with egoism, because it makes preoccupation with our personal salvation after death the centre of all our activity. I am sure that this conception of religion finds no warrant in the Gospels, and surely orthodox theology teaches expressly that it is a duty to love God for Himself alone. The arguments added to prove that the "irreligious" are morally on a higher level than the religious do not strike me as very cogent. It may be true that there is more prostitution among women who are both devout and very poor than among those who are both less devout and less destitute; but is the superior chastity of the latter due to their irreligiosity or to their freedom from want? Again, it may be true that there is more carnal sin among the ignorant and devout than among a less devout but more cultivated class. But, if so, are there not spiritual sins to which the *intellectuals* are prone? Even if all men and women were equally devout one would expect to find the necessitous led by want into faults from which the well-to-do are more immune, and it is dangerous to judge of the spiritual condition of a whole class simply by the frequency of one selected class of delinquencies. To parody a remark of Lewis Nettle-ship's, I have no doubt that there are less believing persons than myself who are better men than I am, but I am not convinced that it is their lack of belief which makes them better.

A. E. T.

Received also:—

- Dr. Th. Ziehen, *Lehrbuch der Logik*, Bonn, A. Marcus & E. Webers, 1920, pp. viii, 866.
 Wilfrid Lay, *The Child's Unconscious Mind*, London, Kegan Paul, Trench, Trubner & Co., 1919, pp. 329.
 Walter S. Hunter, *General Psychology*, University of Chicago, 1919, pp. xiii, 351.

- J. E. Turner, *An Examination of William James's Philosophy*, Oxford, Blackwell, 1919, pp. vii, 76.
- Henry J. Watt, *The Foundations of Music*, Cambridge University Press, 1919, pp. xiii, 239.
- Howard C. Warren, *Human Psychology*, Boston, Houghton, Mifflin & Co., 1919, pp. xvi, 460.
- Alastair Shannon, *Morning Knowledge*, London, Longmans, Green & Co., 1920, xiii, 366.
- Henry C. Link, *Employment Psychology*, New York, The Macmillan Co., 1919, pp. xii, 440.
- C. T. H. Walker, *The Construction of the World in Terms of Fact and Value*, Oxford, Blackwell, 1919, pp. vii, 92.
- John Handyside, *The Historical Method in Ethics and Other Essays*, Liverpool University Press ; London, Constable & Co., 1920, pp. xvi, 97.
- Guido de Ruggiero, *La Filosofia Contemporanea : Germania, Francia, Inghilterra, Italia*, 2 vols., 2nd edizione, Bari, G. Laterza & Figli, 1920, pp. 271, 289.
- Bernard Bosanquet, *Implication and Linear Inference*, London, Macmillan & Co., 1920, pp. ix, 180.
- R. C. Lodge, *An Introduction to Modern Logic*, Minneapolis, The Perine Book Co., 1920, pp. xiv, 361.
- Etienne Gilson, *Le Thomism, Introduction au Systeme de S. Thomas D'Aquin*, Strasbourg, A. Vixie Cie, 1919, pp. 174.
- Chr. Zervos, *Un Philosophe Neoplatonicien du XI^e Siècle Michel Psellos*, Paris, Editions Ernest Leroux, 1920, pp. xvi, 269.
- C. Stanford Read, *Military Psychiatry in Peace and War*, London, Lewis & Co., 1920, pp. 169.
- John Leslie, *Nature and Super-Nature*, Aberdeen, Jolly & Sons, 1920, pp. 80.
- Eriom Freundlich, *The Foundations of Einstein's Theory of Gravitation*, Cambridge University Press, 1920, pp. xvi, 61.
- T. Percy Nunn, *Education: Its Data and First Principles* (The Modern Educator's Library), London, Edward Arnold, 1920, pp. vii, 224.
- E. R. Murray and Henrietta Brown Smith, *The Child under Eight* (The Modern Educator's Library), London, Edward Arnold, 1919, pp. viii, 236.
- Sophie Bryant, *Moral and Religious Education* (The Modern Educator's Library), London, Edward Arnold, 1920, pp. viii, 256.
- Charles Gray Shaw, *The Ground and Goal of Human Life*, The New York University Press, 1919, pp. xii, 593.
- George Willis, *The Philosophy of Speech*, London, George Allen & Unwin, 1919, pp. 256.
- Douglas Clyde Macintosh, *Theology as an Empirical Science*, London, George Allen & Unwin, 1919, pp. xvi, 270.
- G. W. F. Hegel, *The Philosophy of Fine Art*, translated, with notes, by F. P. B. Osmaston, 4 vols., London, G. Bell & Sons, 1920, pp. xxii, 405 ; xiii, 401 ; xv, 430 ; xix, 356.
- W. B. Pillsbury, *The Psychology of Nationality and Internationalism*, New York, London, D. Appleton & Co., 1919, pp. ix, 314.
- W. Powell, *The Infinite Attributes of God*, London, Arthur Stockwell, pp. xxvii, 220.
- Henry C. Link, *Employment Psychology*, New York, Macmillan Co., 1919, pp. xii, 440.
- Joseph Alexander Leighton, *The Field of Philosophy*, Columbus, Ohio, R. G. Adams & Co., 1919, pp. xii, 485.

IX.—PHILOSOPHICAL PERIODICALS.

PHILOSOPHICAL REVIEW. Vol. xxviii., No. 5. **A. Lalande.** 'Philosophy in France, 1918.' [Discusses works on logic (Goblot); on religious and pathological psychology, etc., motivated by the war (Truc, Segond, Gaultier, Dumas, de Lanessan, Combes); and on the history of philosophy (Milhaud, Durkheim, Robin, Delacroix, Bouglé, Moustoxidi, Metzger). Outlines the careers and work of Lachelier and Milhaud.] **H. H. Parkhurst.** 'Platonic Pluralism in Aesthetics.' [Argues for a radical pluralism of subjective universes with (as necessary correlate to this doctrine) a monistic attitude toward the objective. The artist's function, though different from that of the man of science, is thus no less essential; he discovers what is open to him alone to discover; and his obligation is to communicate it (as Flaubert said) in the one perfect rendering.] **G. W. Cunningham.** 'On Nietzsche's Doctrine of the Will to Power.' [We may grant (though it is matter of dispute) that Nietzsche defined fullness of life in qualitative terms as organisation. Even so he is involved in self-contradiction: for he emphasises the struggle of organisation at the expense of its other aspect of harmony. The brotherhood of man is a better interpretation of the will to power than is Nietzsche's superman.] **H. Neumann.** 'Manichæan Tendencies in the History of Philosophy.' [Traces of Manichæism are found both in ancient (Plato and his successors) and in mediæval thought (Augustine). In modern philosophy they abound, for the reason that Manichæism permits the ethical character of the Deity to be saved as it cannot be if God is accounted all-powerful.] Reviews of Books. Summaries of Articles. Notes.

PSYCHOLOGICAL REVIEW. Vol. xxvi., No. 5. **A. P. Weiss.** 'The Mind and the Man-within.' [Human behaviour is determined by nervous function; but as we have no sense-organs whose adequate stimulus is nervous function, we cannot explicate the conditions of the relationship between environment and behaviour. Hence psychology has had recourse to personification: soul or spirit, ego or self, mind or consciousness.] **H. Carr.** 'Length of Time Interval in Successive Association.' [Experiments with rats (alternation-problem) show that an associative nexus can be established over a period of 35 sec.; there is no evidence that rate of learning is a function of interval. Of the two possible explanations by memory-survival and direct connexion, the author inclines to the latter.] **I. Mitchell, I. R. Rosanoff, A. J. Rosanoff.** 'A Study of Association in Negro Children.' [Negro children are inferior to white, though there is overlapping; admixture of white blood does not increase mental capacity; negro children depart farther than white from the normal adult associational standard.] 'Psychological Parerga from the Laboratory of McLean Hospital.' **E. S. Abbot, F. L. Wells.** 'i. Psychogalvanism in the Observation of Stuporous Conditions.' [Perceptive processes in manic-depressive stupor are but slightly lengthened; associations are formed about as rapidly as in health.] **F. L. Wells.** 'ii. Psychotic Performance

in Cancellation and Directions Tests.' [The more complicated or 'synthetic' tests are the better for separating normal and pathological subjects.] **F. L. Wells.** 'iii. Association Type and Personality.' [If we may judge by clinical record of the test, its fidelity to type, and its inter-correlations, the relation (though less simple than supposed by Jung, Pfister, and Ferenczi) is probably not too complex for formulation.] **F. L. Wells.** 'iv. Autistic Mechanisms in Association Reaction.' [The pathological breaking-through of autistic trends into consciousness may set up an attitude of self-reference (egocentric-predicate reaction) or may simply displace the trends of realistic thinking (scattered ideation).] **F. L. Wells.** 'v. Experiments concerning the Threshold of Conscious Learning.' [Experiments by modified technique of Dodge and Benedict. Verbal response and anticipatory key-response apparently indicate two partly dissociated sorts of knowledge, which may move at different rates and in different directions with regard to the conscious threshold.] **S. C. Pepper.** 'Changes of Appreciation for Colour Combinations.' [The greater the observer's experience, the higher is the average of his æsthetic judgment, the greater his consistency, and the less the influence on him of association.] **C. E. Cory.** 'Patience Worth.' [Brief characterisation of the coconscious personalities of Mrs. Curran, the thought-self (Patience Worth) and the every-day, active self. The schism was occasioned, though probably not caused, by some spiritistic efforts.] —Vol. xxvi., No. 6. **G. A. de Laguna.** 'Emotion and Perception from the Behaviourist Standpoint.' [Behaviourism can, as pragmatism and neo-realism do not, take account of the significant differences between emotion and perception. In so far as a stimulus calls into play a specific type of response, belonging to a single genetic and functional system, it possesses emotive quality; in so far as it calls into play an attentive postponement of response, it arouses cognitive awareness and possesses perceptive quality.] **P. W. Cobb.** 'Dark-adaptation with Especial Reference to the Problems of Night-flying.' [If dark-adaptation is disturbed by a standard exposure to light, the time of recovery (to the point of distinguishing a test-object of standard brightness) is a function both of the limit of vision (absolute threshold) in dark-adaptation and of the individual's rate of recovery: both are variables. Two physiological mechanisms may be involved. The relation of the behaviour of dark-adaptation to sensitivity for shade-difference in high illumination is not clear.—Before a test can be formulated, we must have more photometric knowledge of the conditions of night-flying.] **G. H. Thomson.** 'A Direct Deduction of the Constant Process Used in the Method of Right and Wrong Cases.' [Traces the historical development of the process; shows that Urban's correction of Muller's weights is justified; deduces the process from first principles.] **H. A. Carr, A. S. Freeman.** 'Time Relationships in the Formation of Associations.' [Experiments with rats show that successive stimulation (interval of 1 sec.) is more effective for association than simultaneous stimulation, and that the formation of a backward association of stimulus and motor response is exceedingly difficult, if not impossible. So far as published results allow of comparison, there is thus a marked difference between animal and human subjects.] **G. M. Stratton.** 'Retroactive hypermnesia and Other Emotional Effects on Memory.' [Deals especially with instances of retroactive hypermnesia, occurring when the crisis came without warning, and not referrible to frequent review of the experience. Within certain limits of intensity an emotion apparently vivifies backward or forward, and goes behind overt imagery to psychophysical dispositions or traces.]

ARCHIVES DE PSYCHOLOGIE. Tome xvii., No. 2. **J. Fontègne et E. Solari.** 'Le Travail de la téléphoniste: essai de psychologie profession-

nelle.' [The combined result of eight tests (memory, attention, card-sorting, aiming, reaction) correlates well with the judgment of the officials ($r = 0.698$). The failure of certain motor tests shows that the special ability required depends rather on intellectual than on physical endowments. The authors add a general discussion of vocational psychology.] *Recueil de Faits: Documents et Discussions.* **H. Reverdin.** 'Petite note sur un très petit magicien.' [Imitative 'magic'—finding beads on a path—on the part of a boy of 3 years 4 months.] **E. Reymond.** 'Le relâchement musculaire.' [Recommends muscular relaxation as a remedy for certain physical (cough, constipation, etc.) and emotional disturbances.] **C. Werner.** 'XIII^{ème} Réunion des Philosophes de la Suisse Romande, Lausanne, 16 Juin, 1918.' [E. Guillaume on the theory of relativity.] *Bibliographie. Nécrologie.* [E. Yung, P. Dubois, E. Abramowski.] *Notes Diverses.*

ZEITSCHRIFT F. PSYCHOLOGIE. Bd. lxxxi., Heft 4, bis 6. **E. Kueppers.** 'Ueber die Deutung der plethysmographischen Kurve.' [Lehmann's arm-plethysmograph may be relied upon for changes of volume, though not for respiration and pulse. There are, however, only three assured types of the curve of volume: the typical depression consequent upon any noticed stimulus, the curve of tension, and the curve accompanying reflexion (*Besinnen*). Changes of volume are therefore of biological significance, and must be correlated with other peripheral expressions of mental activity (pupil, respiration, bodily attitude); they indicate acts (momentary attention) or states (expectant tension, steady thought with a definite object) of adaptation (*Einstellung*).] **C. Buehler.** 'Ueber die Prozesse der Satzbildung.' [After a discussion of general factors (associative, grammatical, idiomatic) the writer takes up in order Paul's seven schemata of sentence-construction, and illustrates them from her experimental data. On the side of theory she shows that neither Paul's synthetic nor Wundt's analytic principle is psychologically adequate.] **H. J. F. W. Brugmans.** 'Die Verlegenheit: Ihre Erscheinungen und ihr konstitutioneller Grund.' [Describes bashfulness as an emotional, social, and (to the sufferer) insufficiently motivated state; traces the modifications of character which it brings in its train, and the causes which determine its appearance; criticises the views of Dugas, Hartenberg, and Dupuis regarding its predispositional or connate basis. Perhaps a highly sensitive social ego is responsible. A constructive paper is promised.] *Literaturbericht.*—Bd. lxxxii., Heft 1 u. 2. **P. Meyer.** 'Weitere Versuche über die Reproduktion räumlicher Lagen früher wahrgenommener Figuren.' [Continuation of experiments noticed in *MIND*, xxiii., 314. The normal exposure is still, under more strict conditions, preferred; objects in the lower part of the field attract attention; there is a tendency to symmetrical localisation.] **P. Wingender.** 'Beiträge zur Lehre von den geometrisch-optischen Täuschungen.' [Several of the standard figures are exposed in two phases: first, the main lines only are presented, and then the secondary (illusion) lines are flashed in and out. The nervous apparatus by which we cognise the illusory changes in the main lines show a marked inertia; the critical velocity (lower limit of alternate presence and absence of secondary lines with steady persistence of illusion) is about 0.25 sec. The same critical velocity is found for the tridimensional apprehension of stereoscopic figures. No theory is attempted.] **A. Pick.** 'Ueber Gedankenkontamination.' [Stenographic record of examination of a paralytic, which shows contamination of thought.] **H. Berger.** 'Ueber die Energieumsatz im menschlichen Gehirn.' [Calculates tentatively that the total expenditure of energy in the cortex is 160 mkg. in the 1 min., and the transformation into psychical

energy during mental work is 20 mkg. in the 1 min.] **K. Buehler.** 'Eine Bemerkung zu der Diskussion über die Psychologie des Denkens.' [Critique of Henning.] *Literaturbericht.*—Bd. lxxxii., Heft 3 u. 4. **E. Kaila.** 'Versuch einer empiristischen Erklärung der Tiefenlokalisation von Doppelbildern.' [Seeks to explain the normal localisation of double images (their localisation at the distance of the object) on the principle that sensory complexes which have no distinguishing psychical character, but whose physiological correlates are spatially differentiated, may on this account belong to diverse association-systems and operate differently as motives to reproduction. The monocular depth-values assigned to the retinas by Hering as congenital characters thus appear as anomalous special cases of the normal (and primary) binocular localisation of double images. An Appendix discusses the views of Jaensch, and attempts to give them an empiristic turn.] **H. Werner.** 'Rhythmuik, eine mehrdeutige Gestaltenverkettung: Eine phänomenologische Studie.' [There may be temporal repetition without rhythm, and also rhythm without temporal repetition, since a triadic unit is already rhythmical. The phenomenological essence of temporal rhythm is a multivalent (at least a bivalent) concatenation of forms: two forms are so interlocked that each element is embedded in the other, and, in part, predetermined by the other. What holds of temporal holds also of spatial rhythm (visual forms simultaneously presented).] **H. Henning.** 'Assoziationslehre und neuere Denkpsychologie.' [Reply to Bühler.] *Literaturbericht.*

"SCIENTIA" (RIVISTA DI SCIENZA). Series ii. Vol. xxvi. October, 1919. **H. Shapley.** 'Star clusters and the structure of the Universe.' [A review of the more fundamental recent results derived from the light-curves of stars, and largely the work of the author.] **A. Palatini.** 'La teoria di relatività nel suo sviluppo storico. Parte ii^a, La relatività generale.' **A. Meillet.** 'La langue et l'écriture.' [A further development beyond the recent articles of Flinders Petrie and Moret.] **C. Bresciani-Turroni.** 'Ce qu'aurait dû être la 'mitteleuropa'.' **F. J. C. Hearnshaw.** 'La question de l'Islam à la suite de la guerre.' [The author favours an extreme Imperialist view which appears to bring in its train, especially in Persia, Syria, and Mesopotamia, more troubles than it can rectify.] Critical Note. **F. Savorgnan.** 'Nouvelles contributions à l'étude des relations statistiques,' dealing with the work of C. Gini. Book reviews (general). **A. Michel.** On the 'Traité de logique' of E. Goblot. **G. Scorge.** A review of six mathematical works dealing with diverse branches of the subject: (1) E. L. Ince, misspelt as Juce, on a Course of Descriptive Geometry and Photogrammetry for the Mathematical Laboratory; (2) D. Gibb, on a Course of Interpolation and Numerical Integration; (3) A. W. Conway's treatise on Relativity; (4) G. A. Carse and G. Shearer's Course on Fourier Analysis and Periodogram Analysis; (5) H. Bell's Course on Spherical Triangles, and (6) L. E. Ford's introduction to Automorphic Functions. These works are all associated with the Edinburgh Mathematical Laboratory. **A. Boutaric.** Reviews of works on Geodesy and Crystals; **B. L. Vanzetti,** of a treatise on Chemistry; **F. Bottazzi,** of E. H. Starling's Linacre lecture; **J. A. Thomson,** of D'Arcy Thompson's Growth and Form; **C. Bandouin,** of Baldwin's Treatise on Reality, and others. Review of Reviews. Chronicle. French translations of Articles. November, 1919. **H. Shapley.** 'Star Clusters and the Structure of the Universe. Globular Clusters as Cosmic Units.' [This follows naturally on the previous article.] **E. Rignano.** 'Pathologie du raisonnement. I.: L'incohérence et l'illogicité des rêves.' **E. Lattes.** 'Per la soluzione dell' enigma etrusco.' **G. Bourgir.** 'La question du Danube.' [A plea that the League of Nations should make the Danube navigable and capable

of use by all the nations concerned, as a great work of peace.] Book reviews. **G. Loria**, of Picard's *Treatise on Analysis and its Relation to Various Sciences*; **A. Boutaric**, of Mugnet's *Radioactivity and Pomey's Theoretical Electricity*; **B. L. Vanzetti**, of A. W. Stewart's two recent works on *Advances in Chemistry*; **J. A. Thomson**, of Perrier's *La Vie en action*; **Ch. Bandouin**, of Ellis' *Genius of England*, and Toulouse's *Pour penser et agir*; **R. Mounier**, of two works on *Anthropology*; **A. Mariotti**, of two works in Greek by A. M. Andreadis; **C. D. Burns**, of Wilkinson's *Government and the War*, and Burgess' *The Function of Socialisation in Social Evolution*; **G. Stepanow**, of Platonow's *Russian History*. Review of Reviews. Chronicle. December, 1919. **A. Favaro**. 'Il posto di Leonardo nella storia delle scienze.' [The author demonstrates the outstanding character of Leonardo as a master of science, although not the founder of a school to carry on his work.] **E. L. Bouvier**. 'Sur l'origine et les modifications de l'instinct des Hyménoptères paralyseurs.' [The article deals with the instinct of Hymenoptera which paralyse other insects with a view to their use as food for their progeny.] **E. Rignano**. 'Pathologie du raisonnement, II. Fous cohérents et illogiques par monoaffectivisme.' [The continuation of the preceding article. A third part is yet to appear.] **Ch. Seignobos**. 'Le passé et l'avenir de l'Italie.' **G. H. Knibbs**. 'The Problems of Population, Food Supply and Migration.' Book reviews. **G. Loria**, of Böcher's treatise on Strum's Methods and Modern Development; **A. Mieli**, of works relating to Chemistry and Surgery from a Historical Standpoint; **B. L. Vanzetti**, of Copau's Introduction to Chemistry; **F. Bottazzi**, of E. J. Russell's *Soil Conditions and Plant Growth*; **J. A. Thomson**, of Loeb's *Forced Movements, Tropisms, and Animal Conduct*; **G. L. Duprot**, of Kaploun's *Psychologie générale, tirée de l'étude du rêve*; **Ch. Bandouin**, of Mercier's *Treatise on Insanity*; **A. Mariotti**, of Chapman's *Outlines of Political Economy*; **C. D. Burns**, of Cunningham's *The Common Weal*; **J. P. Lafitte**, of Gsell's *Ancient History of Northern Africa*; **E. Rota**, of Richard's *Conflict of National Autonomy and Imperialism*; the two last mentioned are French works. Review of Reviews. Chronicle.

X.—NOTE.

PRIZE IN PSYCHOPHYSICS.

THE prize of \$100 offered in 1914 for the best paper on the "Availability of Pearson's Formule for Psychophysics" (*MIND*, N.S., xxiii., 318 f.) has been awarded to Dr. Godfrey H. Thomson, Armstrong College, Newcastle-upon-Tyne, for a paper entitled "On the Application of Pearson's Methods of Curve-Fitting to the Problems of Psychophysics, especially to the Data of Urban's Experiments on Lifted Weights: in four Parts, together with Part v., On the Use of Compound Curves in the Analysis of Heterogeneous Material, and Part vi., On an Outline of an Attempt to Make a Generalised Psychometric Function".

E. B. TITCHENER.

